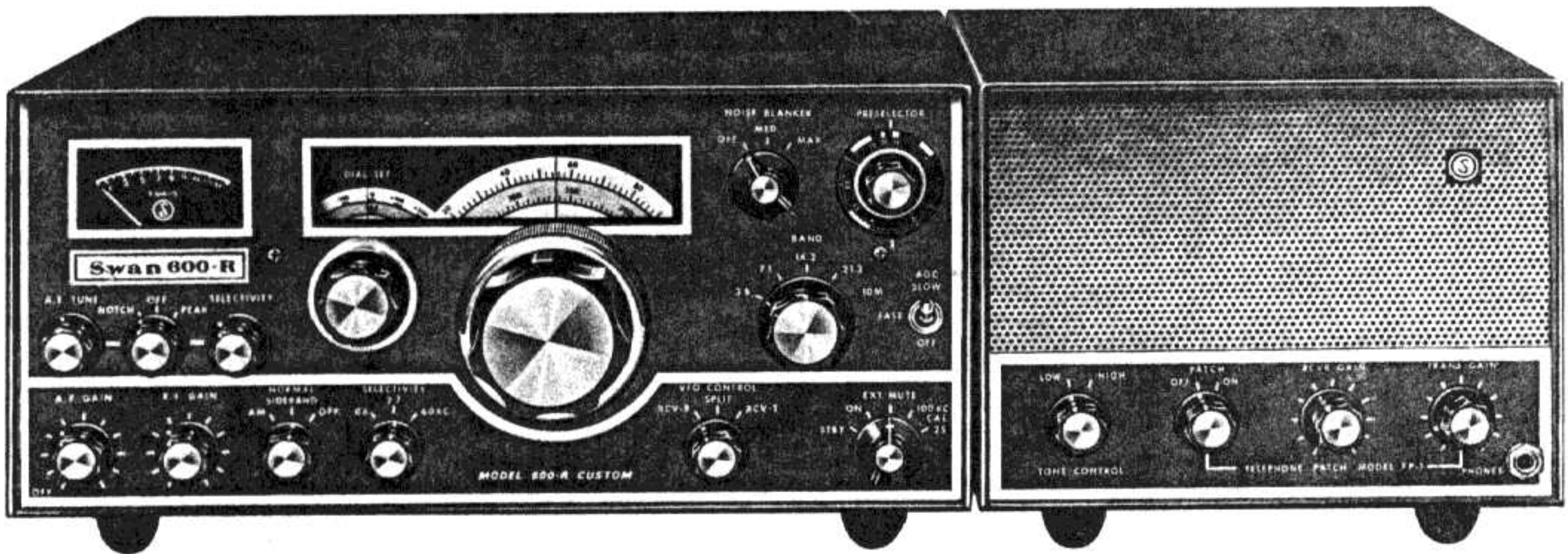


# INSTALLATION OPERATION AND MAINTENANCE



## SWAN MODEL 600-R AND SWAN MODEL 600-R CUSTOM

 **SWAN**  
ELECTRONICS  
Oceanside, California  
A Subsidiary of Cubic Corporation

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## SPECIFICATIONS – Cont'd

### A.F. SELECTIVITY:

Audio response essentially flat from 300 to 3000 cycles  $\pm 3$  db. Audio output, 3 watts to a 4 ohm external speaker.

### SENSITIVITY:

Less than 0.25 microvolts at 50 ohms impedance for signal-plus-noise to noise ratio of 10 db.

### IMAGE REJECTION:

Minimum 55 db. at 30 mc., increasing to better than 75 db. at 3 mc.

### FRONT PANEL CONTROLS:

A.F. GAIN (ON-OFF CONTROL) . . . R.F. GAIN . . .  
SIDEBAND SELECTOR: *AM-NORMAL-OPP* . . . SELEC-  
TIVITY: *0.6-2.7-6.0 KC* . . . VFO CONTROL: *XCV-R-*  
*SPLIT-XCV-T* . . . FUNCTION SWITCH: *STBY-ON-EXT-*  
*MUTE-CAL 100 KC 25 KC* . . . BAND SWITCH: *3.8-7.1-*  
*14.2-21.3-10M* . . . PRESELECTOR . . . AGC CONTROL:  
*SLOW-FAST-OFF* . . . MAIN TUNING . . . DIAL SET.

### REAR PANEL CONTROLS AND CONNECTIONS:

EXT OSC. . . . TO 600-T . . . VFO CONTROL JACKS: *J2-*  
*J3* . . . GND TERMINAL . . . S-METER ZERO . . . FUSE  
2A . . . POWER CORD . . . SPKR JACK . . . CAR. OSC.  
TEST JACK . . . ANTENNA JACK J1.

### TRANSISTOR COMPLEMENT:

Q1	MPS3693	Crystal Calibrator
Q2	MPS3693	Crystal Calibrator
Q3	MPS3693	Crystal Calibrator
Q4	MPS3693	Crystal Calibrator
Q5	2N706	VFO Oscillator
Q6	2N706	Buffer Amplifier
Q7	2N706	Isolation Amplifier
Q8	2N706	Isolation Amplifier
Q9	2N706	BFO Amplifier

### DIODE COMPLEMENT:

D101	1N914	R.F. GAIN Diode
D501	1N34A	Product Detector Diode
D701	2N914	AGC Diode
D702	1N914	AGC Diode
D703	1N914	AGC Diode
D1201	1N4002	Power Supply Diode
D1202	1N4002	Power Supply Diode
D1203	1N4002	Power Supply Diode
D1204	1N4002	Power Supply Diode
D1205	1N4002	Power Supply Diode
D1206	ZENER	Voltage Regulator

### VACUUM TUBE COMPLEMENT:

V1	6BZ6	R.F. Amplifier
V2	6BZ6	Mixer
V3	12BA6	First I.F. Amplifier
V4	12BA6	Second I.F. Amplifier
V5	12AX7	Product Detector/First Audio Amplifier
V6	12AQ5	A.F. Output
V7	12AV6	AGC Amplifier

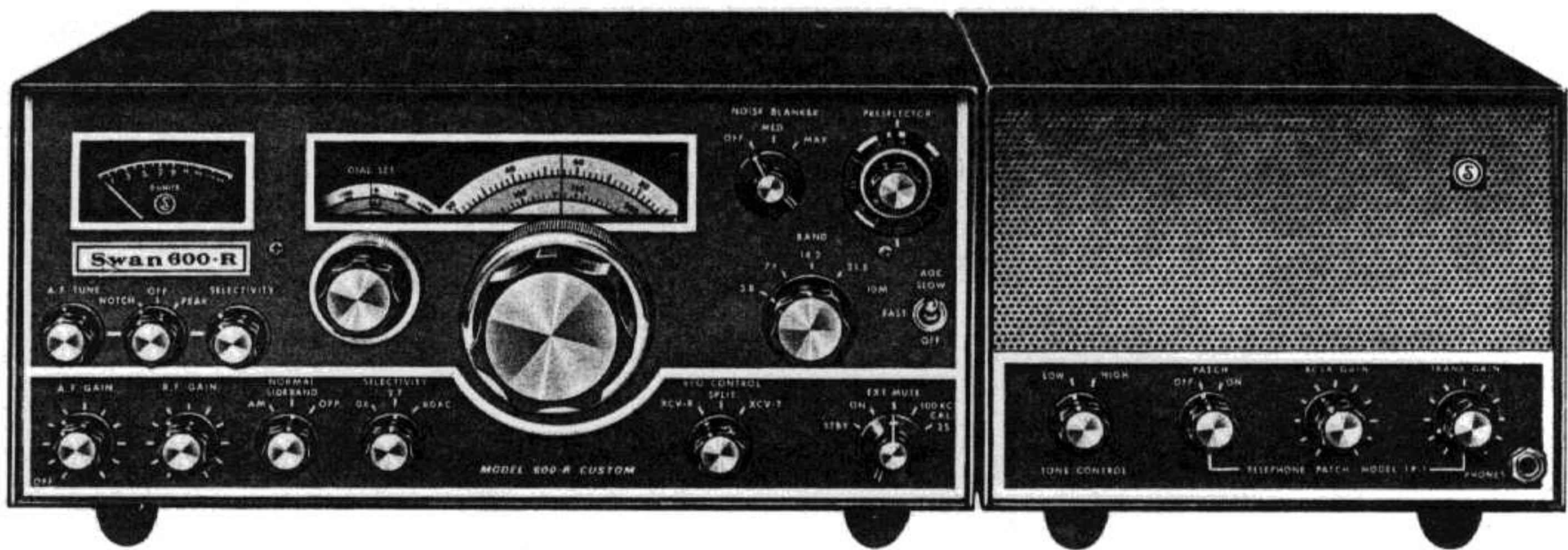
### POWER REQUIREMENTS:

117 volts, 50-60 cycles. Current consumption: 1 amp in STBY position or ON position.

### DIMENSIONS:

15 inches wide  
6-1/2 inches high  
12 inches deep  
Weight – 23 pounds





# SWAN MODEL 600-R CUSTOM RECEIVER

## ADDITIONAL SPECIFICATIONS FOR 600-R CUSTOM

The specifications for the SWAN MODEL 600-R CUSTOM RECEIVER are the same as those for the STANDARD receiver, except for the addition of the NB-600 Noise Blanker, and the I.C. Audio Notcher-Peaker.

### NB-600 NOISE BLANKER

Operating Frequency: 5.5 mc.

No. of Stages: Two

Controls: 3 position Switch: *OFF-MED-MAX*

Diodes: D1401 1N34A, D1402 2N34A

Vacuum Tubes: V8 12BA6 1st Amp.

V9 12BA6 2nd Amp.

### I.C. AUDIO NOTCHER-PEAKER

Frequency Range: 300-3000 cycles

Notch Depth: 40-50 db.

Bandwidth in Peak Mode: Approximately 10% of center Frequency.

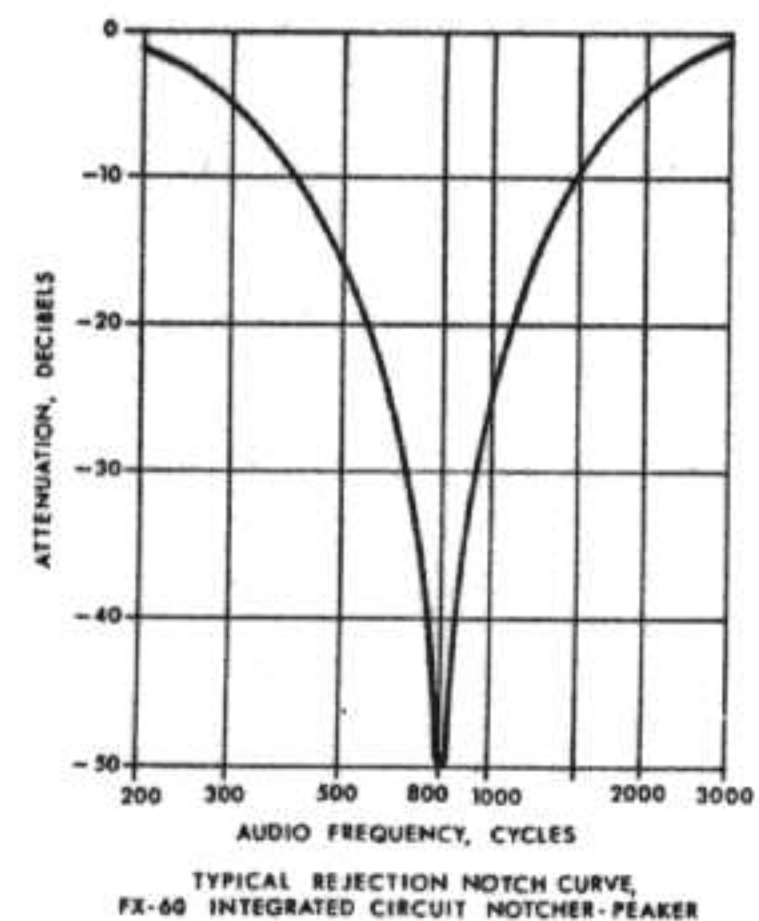
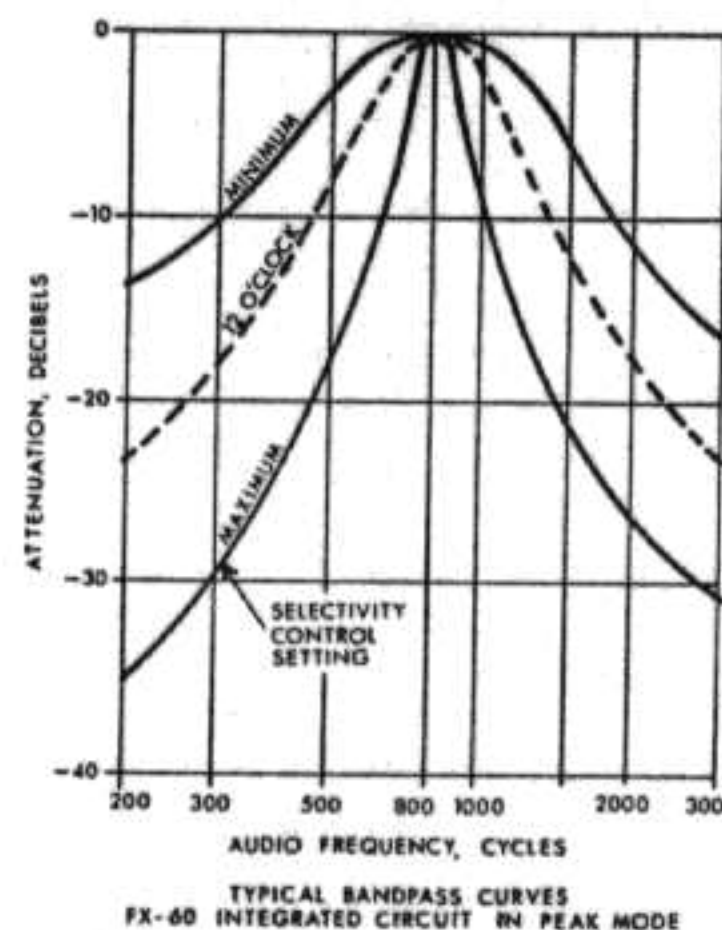
Controls: (a) A.F. TUNE  
(b) NOTCH-OFF-PEAK  
(c) SELECTIVITY

Solid State Components:

FX-60 Integrated Circuit

40468A FET

1N4742 Zener Diode



## INTRODUCTION

The Swan Model 600-R receiver is designed to be used in CW, AM, SSB, FSK, and SSTV modes over all portions of the 80, 40, 20, 15, and 10 meter amateur radio bands. Expanded frequency coverage is possible with the use of the optional accessory 510X Crystal Controlled Oscillator or Model 330 General Coverage VFO. Basic circuitry of the single conversion design has been proven in many thousands of the popular Swan Transceivers. Mechanical, electrical, and thermal stability is exceptionally high. All oscillators are temperature compensated and voltage regulated. Operation may be fixed or portable. Receiver sensitivity is 1/4

microvolt at 50 ohms for 10 db signal plus-noise to noise ratio. Options include 0.6 KC CW filter, 6 KC AM filter, and SS-16B Super Selective Crystal Lattice Filter. Power is supplied by the built-in 117 volt power supply.

### SWAN MODEL 600-R CUSTOM RECEIVER:

The Swan Model 600-R Custom Receiver comes to you with all the above provisions, and in addition, includes the NB-600 I.F. Noise Blanker, and the Integrated Circuit Audio Filter (I.C.A.F.) adjustable audio NOTCHER-PEAKER.

## CIRCUIT THEORY

Refer to Figure 1, and the schematic diagram for the following discussion.

The antenna and grid circuit of the R.F. Amplifier V1, are tuned by L101 through L105. These coils are normally tuned to the center of their respective phone bands. Peak frequency tuning is accomplished with the variable capacitor C104A. This capacitor is the front panel PRESELECTOR control. The gain of the R.F. Amplifier is controlled by the manual R.F. GAIN control R107, which varies the bias on the amplifier. C107 couples the incoming RF signal to the grid of the R.F. Amplifier. The plate circuit of the R.F. Amplifier, and the grid circuit of the Mixer V2, are tuned by L201 through L205. These coils are also normally tuned to the center of their phone bands. Peak frequency tuning is accomplished with the second section of the ganged PRESELECTOR capacitor C104B.

The tuned signal is coupled through C207 to the grid of the Mixer, where it is heterodyned with the VFO injection frequency. The VFO frequency is initiated in the transistorized VFO/BUFFER amplifier circuit Q5, Q6. Q5, the VFO oscillator operates in the common base configuration. The Buffer amplifier Q6, is also used for isolation. The stability of the VFO is also enhanced by the use of the Zener diode regulator D1206 across the bias supply voltage. Band switching is accomplished by changing the VFO coils L1101 through L1105. Further isolation is provided by the transistorized Isolation Amplifier Q7. The transistorized Isolation Amplifier Q8, provides additional isolation for the transmitter VFO, when the 600-T transmitter is interconnected.

The injection frequency generated by the VFO is routed to the cathode of the Mixer through C208, where it is sub-

tractively heterodyned with the incoming RF signal. The resultant output of the heterodyning process is the receiver intermediate frequency, nominally 5500 KC. The I.F. signal is coupled from the secondary winding of T201 through the Crystal Lattice Filter to the grid of the First I.F. Amplifier V3. The signal is amplified and coupled through T301 to the grid of the Second I.F. Amplifier V4, and then coupled through T401 to the grid of the Product Detector V5A.

In the Swan Model 600-R Custom, the I.F. signal is coupled from the secondary winding of T201 to the control switch of the I.F. Noise Blanker, Model NB-600. When the control switch is in the OFF position, the signal is passed through the control switch to the Crystal Lattice Filter, and then to the grid of the First I.F. Amplifier. With the control switch in either "MED" or "MAX", the signal is coupled through T1401 to the grid of V8. The signal and noise is amplified and coupled through T1402 to the grid of V9. The signal and noise is further amplified and fed into the clipping network consisting of D1401, D1402, C1406, C1407, C1408, C1409, and R1406, where the noise peaks are clipped off. The I.F. signal is then coupled through T1403; through the attenuation network, where the I.F. signal level is returned to the approximate input level, and then fed into the Crystal Lattice Filter and processed the same as the standard 600-R. In "MAX" position, the NB-600 is operating at full gain, producing maximum clipping of noise pulses. With many strong signals on the band it is possible for V9 to overload. In "MED" position, the NB-600 operates at reduced gain, with considerably less tendency to overload, but still providing good clipping action. The attenuator network is switched to equalize NB-600 output.

The carrier frequency is generated by the transistorized crystal controlled Beat Frequency Oscillator (BFO) Q9. The signal from the BFO is fed into the cathode of the Product Detector through C503. In the NORMAL sideband mode, the carrier frequency is generated at 5500 kc., and in the OPPOSITE sideband mode, the carrier is generated at 5503.3 kc.

In the Product Detector, the BFO signal is heterodyned with the I.F. signal, and the resultant audio is then amplified by the First Audio Amplifier V5B.

In the Swan Model 600-R Custom, the audio signal from the Product Detector is coupled through C502 to the control switch of the I.C.A.F. (Integrated Circuit Audio Filter) Adjustable Audio NOTCHER-PEAKER. When the control switch is in the OFF position, the audio signal is passed through the switch back to the grid of the First Audio Amplifier. When the control switch is in the NOTCH position, an unwanted tone can be nulled out by rotating the A.F. TUNE control. In this position, the SELECTIVITY control has no effect on the signal. When the control switch is in the PEAK position, a desired CW tone is adjusted for maximum strength by rotating the A.F. TUNE control. The SELECTIVITY control may be turned clockwise to reduce bandwidth, or counter clockwise to increase bandwidth. Normally this control will be set to about 12 o'clock.

When receiving AM signals, the BFO is switched off, and the Product Detector operates as a conventional AM detector.

The output of the First Audio Amplifier is coupled through C506, and the A.F. GAIN control R601, to the grid of the

Audio Output Amplifier V6. The output of the A.F. Output stage is coupled through T601 to the 4 ohm speaker jack. The audio signal is also fed to the grid of the AGC Amplifier V7, through C507. The audio voltage is rectified and amplified by V7 and D701. D702 and D703 provide DC blocking to the AGC Amplifier. The negative voltage developed by the AGC Amplifier is fed back to the grid circuits of the R.F. Amplifier, and the I.F. Amplifiers.

Receiver muting is accomplished by externally ungrounding the negative 35 volt bias line to V1, V2, and V3 through pin 9 of the "TO 600-T" socket on the rear panel.

Power for the receiver is supplied by the built-in power supply. Full-wave rectification is provided by the bridge circuit comprised of D1201 through D1204, which supplies the positive 225 and 200 volt plate and screen voltages. The filter network is comprised of C1205A/B, C1206A/B, and R1201, R1202, and R1203. R1206 is the power supply bleeder resistor. The 12.6 AC filament voltage is supplied by a separate winding of T1201. The negative 35 volt bias is developed across D1205. Voltage regulation of the negative 12 volts is achieved by the use of Zener Diode D1206.

The transistorized crystal calibrator provides 100 kc and 25 kc calibration markers for proper dial alignment. Q1 and Q2, along with the 100 kc crystal Y1301, provide the 100 kc marker. Q3 and Q4 are the multivibrator circuit which divides the 100 kc signal by a factor of 4, thus providing calibration markers every 25 kc. The output of the calibrator is coupled through C1305 to the antenna input circuit.

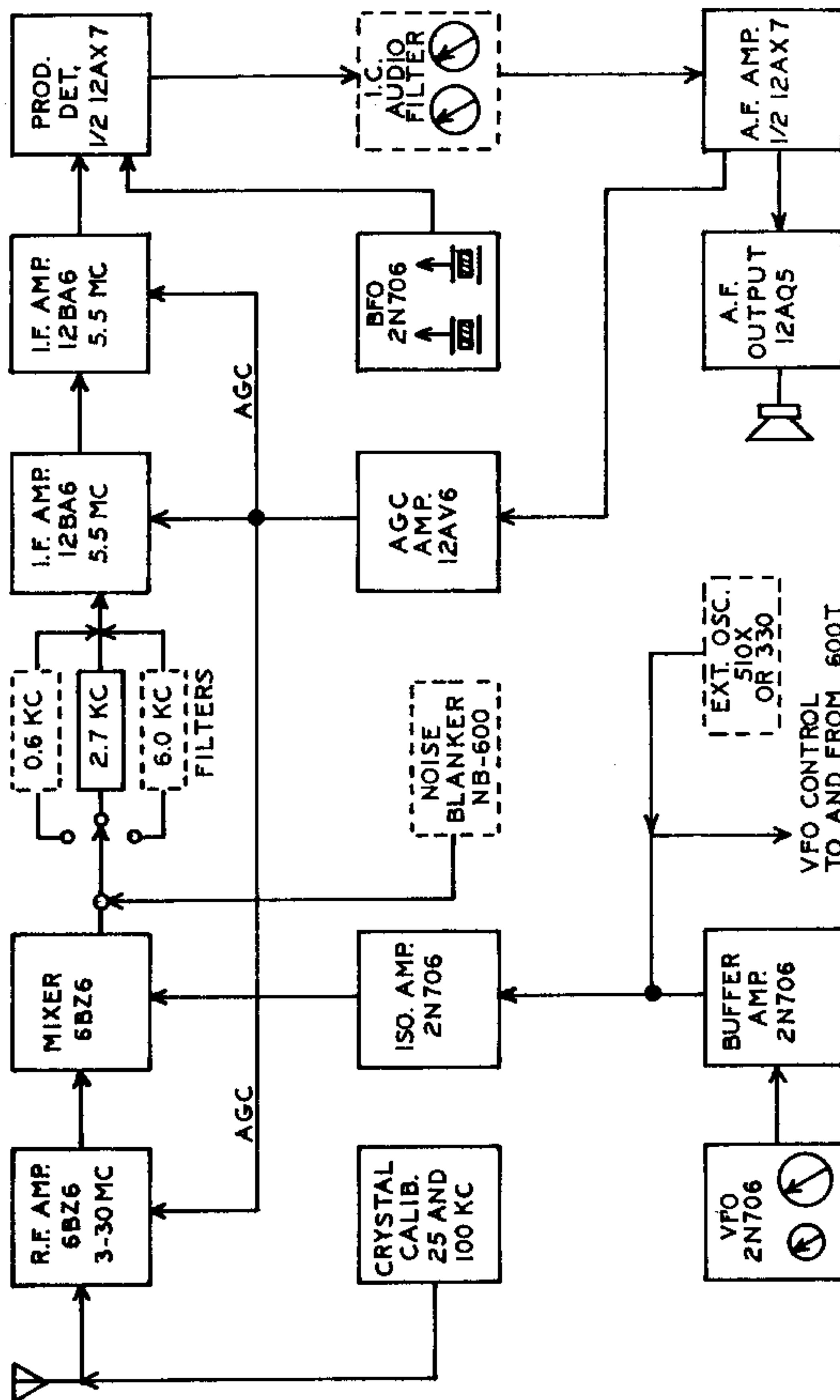


FIGURE 1. RECEIVER BLOCK DIAGRAM



# SINGLE SIDEBAND RECEPTION

To permit a logical discussion of the techniques and circuits required to process a single-sideband-suppressed-carrier signal through the Swan Model 600-R Receiver, it is important to understand the generation of a voice modulated radio frequency signal.

## SIDEBAND GENERATION:

When a modulated audio frequency, such as one produced by a human voice, is heterodyned with an RF carrier frequency, sideband frequencies are generated which are the sum of, and the difference between, the two heterodyned frequencies. To many, these sideband frequencies are thought of as having only a single frequency with a very small bandwidth. In fact, however, these sidebands are separated from the RF carrier frequency by the sum and difference of the audio frequency. For example, a typical intelligible voice signal contains audio frequencies in the frequency range of 300 to 3000 cycles. If this modulating audio frequency is heterodyned with an RF carrier frequency of 5,500,000 cycles, the resultant sum frequencies cover the frequency range of 5,500,300 cycles to 5,503,000 cycles, and these are called the upper sideband. Likewise, the difference frequencies cover the frequency range of 5,499,700 cycles to 5,499,700 cycles, and are called the lower sideband. From the above information, it is apparent that each of the sidebands occupy a bandwidth of approximately 2,700 cycles.

Since the sideband frequencies carry all the audio intelligence that is impressed on the RF carrier frequency, and the intelligence contained in one of the sidebands is exactly duplicated in the other sideband, only one of the sidebands needs to be transmitted. The other sideband and carrier can be suppressed. It should be remembered that in the single-sideband-suppressed-carrier mode of transmission, the unwanted sideband and carrier are greatly suppressed, but not entirely eliminated. It should also be noted that Swan Transmitters and Receivers normally employ a 5500 kc upper sideband I.F. system. Normal operation on 80 and 40 meters is lower sideband, while on 20, 15, and 10 meters, normal operation is upper sideband.

## SINGLE SIDEBAND RECEPTION:

It is important to keep in mind that the sideband that is being received is actually a band of frequencies approximately 2.7 kc wide. Since the normal I.F. of the Swan Model 600-R Receiver is a 5500 kc USB I.F. system, those RF frequencies which are LSB must be inverted to USB

before detection and recovery of the audio intelligence. On 80 and 40 meters, the normal LSB RF operating frequency is subtractively heterodyned with the receiver VFO injection frequency in the Mixer circuit, and the resultant difference frequency selected at the output of the mixer is the USB I.F. For example, if a LSB RF operating frequency of 3899.7 kc to 3897.0 kc is subtractively heterodyned with the receiver VFO injection frequency of 9400.0 kc, the resultant output of the mixer circuit is the 5500.3 kc to 5503.0 kc USB I.F. In other words, the LSB RF operating frequency has been inverted to a USB I.F. signal by the subtractive heterodyning process.

On 20, 15, and 10 meters, the receiver VFO injection frequency is also subtractively heterodyned with the normal USB RF operating frequency in the Mixer circuit, and the resultant difference frequency selected at the output of the mixer is the USB I.F. For example, if the receiver VFO injection frequency of 8700.0 kc is subtractively heterodyned with the normal USB RF operating frequency of 14200.3 kc to 14203.0 kc, the resultant output of the mixer circuit is the 5500.3 to 5503.0 kc USB I.F. Note that on these bands, the inversion process does not take place.

When operation is desired on the opposite sideband, that is, USB on 80 and 40 meters, or LSB on 20, 15, and 10 meters, the I.F. system is changed to a LSB I.F. system. On 80 and 40 meters, the USB RF operating frequency is heterodyned with the receiver VFO injection frequency, and the resultant difference frequency selected at the output of the mixer circuit is the LSB I.F. On 20, 15, and 10 meters, the LSB RF operating frequency is heterodyned with the receiver VFO injection frequency, and the resultant difference frequency selected at the output of the mixer circuit is the LSB I.F.

In order to detect and reproduce the audio intelligence contained in the USB or LSB I.F. signal, the carrier frequency must be reinserted before the audio stages of the receiver. In the Swan 600-R, this reinsertion takes place at the Product Detector stage in the following manner.

The normal USB I.F. of 5500.3 kc to 5503.0 kc is subtractively heterodyned with the carrier frequency of 5500 kc, and results in a difference audio frequency of 300 to 3000 cycles at the output of the Product Detector. When the I.F. of the receiver is the LSB I.F., the Opposite carrier crystal frequency of 5503.3 kc is switched into the circuit and subtractively heterodyned with the LSB I.F. of 5503.0 to 5500.3 kc, and results in a difference audio frequency of 300 to 3000 cycles.

# NORMAL SIDEBAND SIGNAL PROCESSING

Band	Signal Input		VFO Injection Frequency	Heterodyning Process In Mixer	I.F. Frequency (Filter Passband)	Carrier Oscillator Frequency	Heterodyning Process In Product Detector	Audio Freq.
	RF Carrier Frequency (Suppressed)	*Sideband Frequencies						
80M	3900 kc	LSB 3899.7 kc to 3897.0 kc	9400.0 kc	subtractive 9400.0 9400.0 3899.7 3897.0 <u>5500.3 5503.0</u>	5500.3 kc to 5503.0 kc USB	5500 kc	subtractive 5500.3 5503.0 5500.0 5500.0 <u>0.3 3.0</u>	300 to 3000 cycle
40M	7100 kc	LSB 7099.7 kc to 7097.0 kc	12600.0 kc	subtractive 12600.0 12600.0 7099.7 7097.0 <u>5500.3 5503.0</u>	5500.3 kc to 5503.0 kc USB	5500 kc	subtractive 5500.3 5503.0 5500.0 5500.0 <u>0.3 3.0</u>	300 to 3000 cycle
20M	14200 kc	USB 14200.3 kc to 14203.0 kc	8700.0 kc	subtractive 14200.3 14203.0 8700.0 8700.0 <u>5500.3 5503.0</u>	5500.3 kc to 5503.0 kc USB	5500 kc	subtractive 5500.3 5503.0 5500.0 5500.0 <u>0.3 3.0</u>	300 to 3000 cycle
15M	21300 kc	USB 21300.3 kc to 21303.0 kc	15800.0 kc	subtractive 21300.3 21303.0 15800.0 15800.0 <u>5500.3 5503.0</u>	5500.3 kc to 5503.0 kc USB	5500 kc	subtractive 5500.3 5503.0 5500.0 5500.0 <u>0.3 3.0</u>	300 to 3000 cycle
10M	28500 kc	USB 28500.3 kc to 28503.0 kc	23000.0 kc	subtractive 28500.3 28503.0 23000.0 23000.0 <u>5500.3 5503.0</u>	5500.3 kc to 5503.0 kc USB	5500 kc	subtractive 5500.3 5503.0 5500.0 5500.0 <u>0.3 3.0</u>	300 to 3000 cycle
* A.F. Modulation from 300 to 3000 cycles.								

# OPPOSITE SIDEBAND SIGNAL PROCESSING

Band	Signal Input		VFO Injection Frequency	Heterodyning Process In Mixer	I.F. Frequency (Filter Passband)	Carrier Oscillator Frequency	Heterodyning Process In Product Detector	Audio Freq.
	RF Carrier Frequency (Suppressed)	*Sideband Frequencies						
80M	3900 kc	USB 3900.3 kc to 3903.0 kc	9403.3 kc	subtractive 9403.3 9403.3 3900.3 3903.0 5503.0 5500.3	5503.0 kc to 5500.3 kc LSB	5503.3 kc	subtractive 5503.3 5503.3 5503.0 5500.3 0.3 3.0	300 to 3000 cycle
40M	7100 kc	USB 7100.3 kc to 7103.0 kc	12603.3 kc	subtractive 12603.3 12603.3 7100.3 7103.0 5503.0 5500.3	5503.0 kc to 5500.3 kc LSB	5503.3 kc	subtractive 5503.3 5503.3 5503.0 5500.3 0.3 3.0	300 to 3000 cycle
20M	14200 kc	LSB 14199.7 kc to 14197.0 kc	8696.7 kc	subtractive 14199.7 14197.0 8696.7 8696.7 5503.0 5500.3	5503.0 kc to 5500.3 kc LSB	5503.3 kc	subtractive 5503.3 5503.3 5503.0 5500.3 0.3 3.0	300 to 3000 cycle
15M	21300 kc	LSB 21299.7 kc to 21297.0 kc	15796.7 kc	subtractive 21299.7 21297.0 15796.7 15796.7 5503.0 5500.3	5503.0 kc to 5500.3 kc LSB	5503.3 kc	subtractive 5503.3 5503.3 5503.0 5500.3 0.3 3.0	300 to 3000 cycle
10M	28500 kc	LSB 28499.7 kc to 28497.0 kc	22996.7 kc	subtractive 28499.7 28497.0 22996.7 22996.7 5503.0 5500.3	5503.0 kc to 5500.3 kc LSB	5503.3 kc	subtractive 5503.3 5503.3 5503.0 5500.3 0.3 3.0	300 to 3000 cycle
* A.F. Modulation from 300 to 3000 cycles.								



# INSTALLATION

## POWER SUPPLY:

The Swan Model 600-R built-in power supply provides all the necessary voltages required by the receiver for 117 volt, 50-60 cycle operation. The receiver comes complete with a pre-wired plug and cable, all ready for plugging into the AC power source.

## ANTENNA:

Any of the common antenna systems designed for use on the high frequency amateur bands may be used with the receiver. The antenna input has been designed for a 50 or 75 ohm unbalanced coaxial cable input. An odd length of wire can be used for an antenna, but the receiver will not perform as well as when the antenna has been constructed for use on the amateur bands.

## SPEAKER JACK:

Receiver audio output from the 600-R is for a 3 to 4 ohm voice coil impedance. This output is terminated at the SPKR jack located on the rear panel of the receiver. The optional accessory Model 600-S or 600-SP Speakers have been designed specifically for the 600-R receiver, and have excellent audio characteristics. The 600-S is a matching cabinet with a 5 x 7 inch speaker. The 600-SP includes the Swan FP-1 phone patch.

## HEADPHONES:

Both speaker models provide a headphone jack. High impedance phones are recommended because the impedance mismatch produces the desired amount of attenuation for headphone volume. Low impedance phones may be used, but attenuation will not be as great, and it will be possible to damage the phones by turning the A.F. GAIN on full, so care must be exercised if low impedance phones are used.

## CABLE CONNECTIONS:

Cable connections for interconnecting the 600-R to the matching Swan Model 600-T Transmitter are shown in Figure 2. These cables are supplied with the 600-T.

## INTERCONNECTION CABLING WITH SWAN TRANSCEIVERS AND OTHER TRANSMITTERS:

A cable harness, Model CK-1, is available from Swan Electronics for interconnecting the 600-R receiver with your

Swan 350C, 500C, 500CX, 270, and 270B Transceivers. Figure 3 shows the interconnecting cabling for the 350C, 500C, and 500CX, and Figure 4 shows the interconnecting cabling for the 270 and 270B. Complete instructions for interconnecting the 600-R to the Swan Transceivers are contained with each cable harness. The CK-1 cable kits are available from your Swan distributor, or from the Swan factory. For transmitters/transceivers other than Swan, Figure 5 shows cabling requirements needed for interconnection with the 600-R.

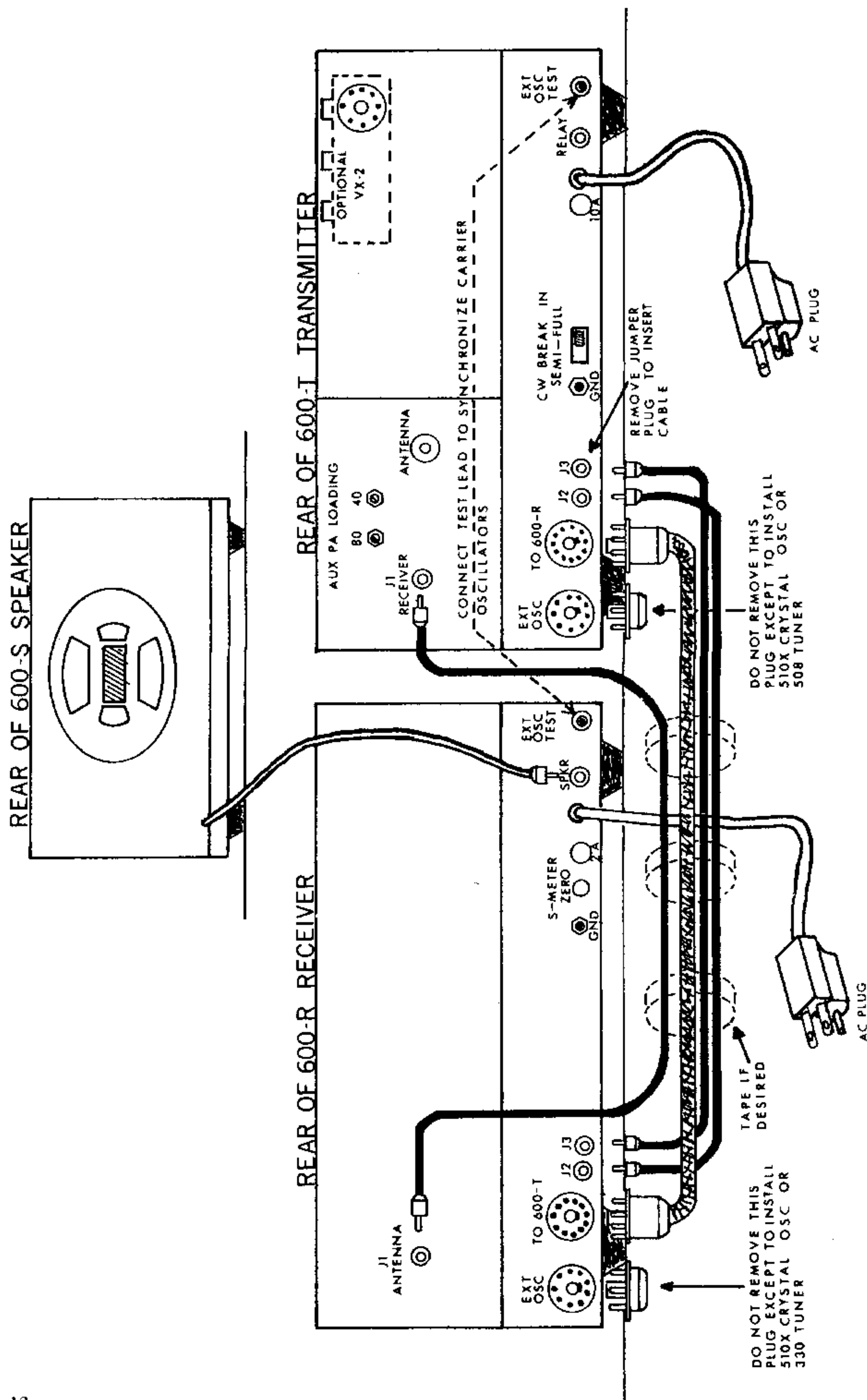
## CARRIER SYNCHRONIZATION:

When operating the 600-R with the 600-T or Swan Transceiver, it is important that the carrier oscillators in each unit be exactly on the same frequency, otherwise, the transmitting and receiving frequencies in the TRANSCEIVE mode will not be the same. To synchronize the 600-R with the 600-T or Swan Transceiver:

1. Turn both units on.
2. Place the Function Switch on the 600-T in the PTT position, or in the case of a Swan Transceiver, put it in Receive mode.
3. Turn the R.F. GAIN control on the 600-R to the full counter clockwise position.
4. Turn the A.F. GAIN control on the 600-R to the full clockwise position.
5. Set the SIDEBAND SELECTOR switch on both units to the NORMAL position.
6. A Test Jack is provided on the back of the 600-R and 600-T labeled "CAR. OSC. TEST". Connect a wire jumper between each jack. The jumper can be a test lead with a test prod on each end, or just about any odd piece of wire, stripped on each end, and inserted into the test jacks.

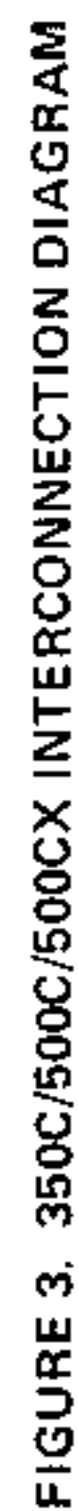
## NOTE

When operating the 600-R with a Swan transceiver, locate the Carrier Oscillator Crystal in the transceiver, and loosely couple one end of the insulated test lead around the crystal can. One turn around the crystal will be enough. Do not remove insulation from this end of the test lead. A small amount of capacity coupling is all that is required. The other end of the test lead then plugs into the test jack on the 600-R.

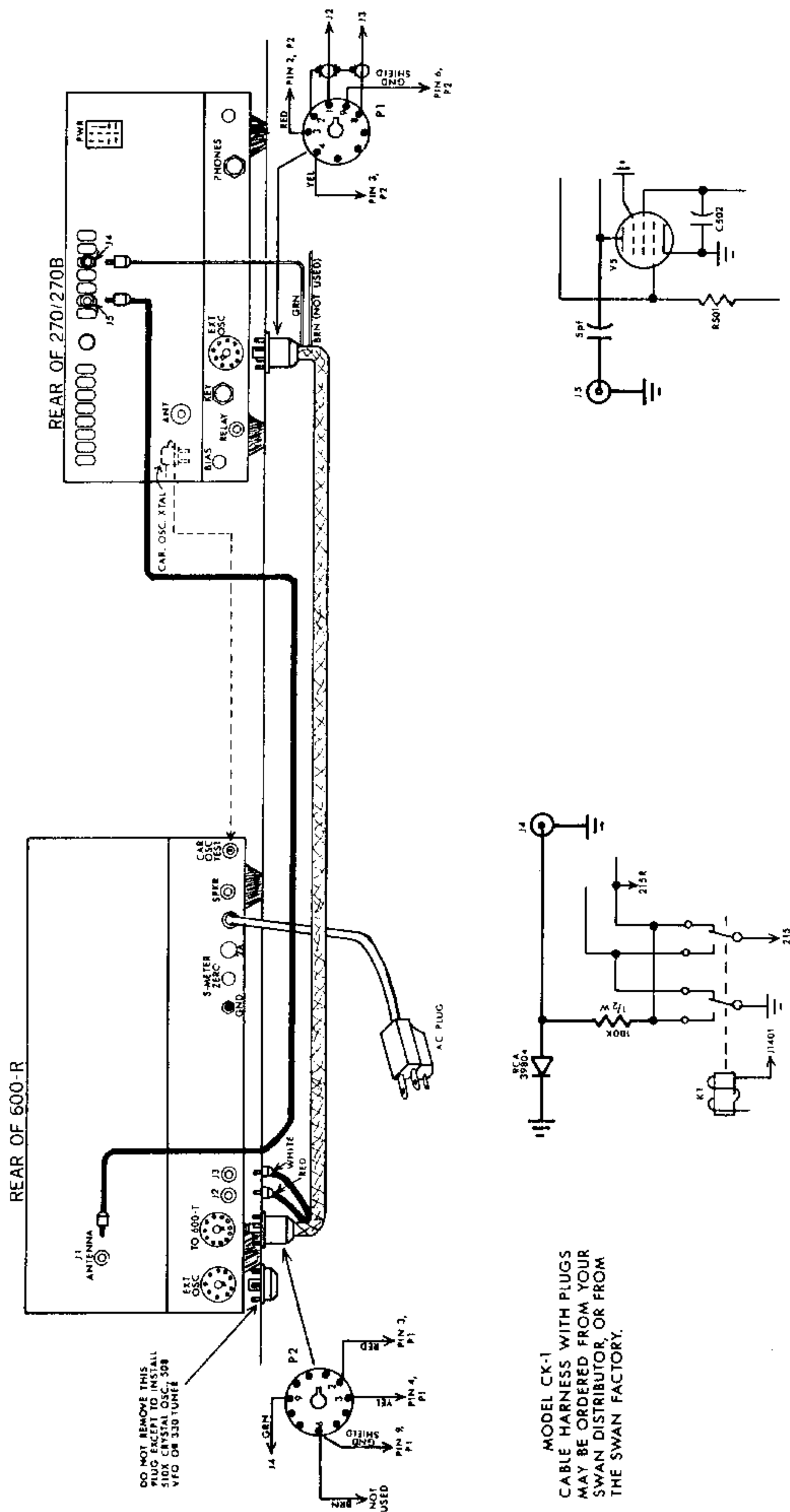


NOTE: THIS CABLE SYSTEM IS FURNISHED WITH THE 600-T TRANSMITTER

FIGURE 2. INTERCONNECTION DIAGRAM 600-R TO 600-T

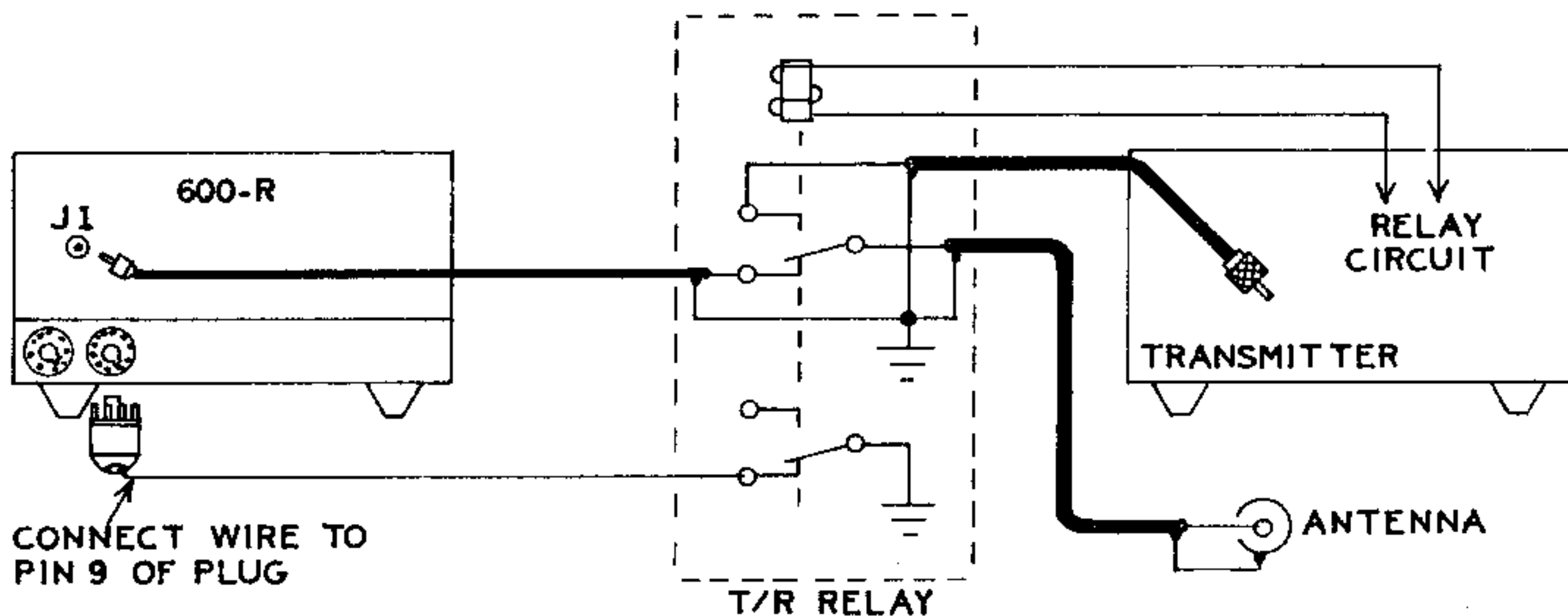






7. A low pitch tone will be heard in the receiver speaker, unless the oscillators are already zero beat. Place the receiver on its side, and locate the CAR. FREQ. ADJUST trimmers. Turn the NORMAL SIDEBAND trimmer slowly until exact zero-beat is heard.
8. Switch both units to OPPOSITE sideband. Adjust the OPPOSITE SIDEBAND trimmer for exact zero-beat.
9. The units are now fully synchronized.

**Important:** The carrier frequency trimmers on the transmitter should not be adjusted at this time. This has been factory adjusted during transmitter audio tests. Instructions for adjusting transmitter carrier frequencies are contained in the 600-T manual, as well as in the Swan Transceiver manuals. It is important to remember that if the 600-T carrier frequencies are ever re-adjusted for any reason, or if the Swan Transceiver carrier frequencies are changed, it will then be necessary to perform the Carrier Synchronizing procedure again on the 600-R.



NOTE: Most transmitters will have the Antenna Switching relay built-in, and will have auxiliary terminals for receiver muting. However, if your transmitter does not include relay switching, an external relay as illustrated, will be required. This may be a coaxial type antenna relay (which usually has auxiliary contacts), or any double pole-double throw relay suitable for R.F. Antenna switching. The relay coil must be energized by the transmitter T/R circuits, so its voltage rating will depend on the specific transmitter being used. Check transmitter schematic for information on this.

FIGURE 5. INTERCONNECTION CABLING FOR OTHER TRANSMITTERS/TRANSCEIVERS

# OPERATION

## CONTROL FUNCTIONS:

### ON-OFF SWITCH (On A.F. GAIN Control)

Turns power supply on and off.

### A.F. GAIN

Controls potentiometer R601 in grid circuit of V6 A.F. Output. Controls Audio volume.

### R.F. GAIN

Controls variable resistor R107. Controls gain of R.F. Amplifier V1, I.F. Amplifiers V3, V4.

### SIDEBAND SELECTOR

*AM* – Removes the negative 12 volts from the BFO Oscillator Q9.

*NORMAL* – Selects the NORMAL 5500 kc crystal. This provides LSB operation on 80 and 40 meters, and USB operation on 20, 15, and 10 meters.

*OPPOSITE* – Selects the OPPOSITE 5503.3 kc crystal. This provides USB operation on 80 and 40 meters, and LSB operation on 20, 15, and 10 meters.

### SELECTIVITY

*0.6* – This position is used when the optional accessory 600 cycle CW filter is installed.

*2.7* – Selects the standard 5500 kc, 2.7 kc passband, 1.7 shape factor, Crystal Lattice Filter, or the optional accessory SS-16B, 5500 kc, 2.7 kc passband, 1.28 shape factor, 16 pole Super Selective Crystal Lattice Filter.

*6.0* – This position is used when the optional accessory 6 kc AM filter is installed.

### VFO CONTROL

*XCV-R* – When the VFO CONTROL is in the XCV-R position, the 600-R and 600-T, or Swan Transceiver operate TRANSCEIVE, with the 600-R VFO controlling the receiver and transmitter frequencies. The transmitter will transmit on the same frequency that the receiver is tuned to. When the 600-R is used with the 600-T, the Dial Lights on the transmitter will go out in this position.

*SPLIT* – When the VFO CONTROL is in the SPLIT position, the receiver VFO controls the receive frequency, and the transmitter/transceiver VFO controls the transmit frequency.

*XCV-T* – When the VFO CONTROL is in the XCV-T position, operation is TRANSCEIVE, with the transmitter VFO controlling the transmitter and receiver frequency. The receiver will be tuned to

the same frequency that the transmitter is tuned to. When the 600-R is used with the 600-T, the Dial Lights on the receiver will go out in this Position.

### FUNCTION SWITCH

*STBY* – The R.F. Amplifier V1, I.F. Amplifiers V3, V4, and the First Audio Amplifier V5B are biased to cutoff.

*ON* – The bias line is grounded through a contact on S3, removing the cutoff bias to V1, V3, V4, and V5B.

*EXT. MUTE* – This position provides external muting of the receiver by ungrounding the bias line through pin 9 of the "TO 600-T" socket on the rear panel of the receiver. When the 600-T or Swan Transceiver is interconnected with the 600-R, the receiver is automatically muted when the transmitter is keyed.

*CAL. 100 kc* – A calibration marker is provided every 100 kc for accurate dial alignment.

*25 kc* – A calibration marker is provided every 25 kc for accurate dial alignment.

### DIAL SET

Zero beats the calibration markers for accurate dial alignment. Extends the frequency segments for extended coverage. Controls C1107 in VFO circuit.

### MAIN TUNING

Controls C1106 in frequency determining VFO circuit.

### BAND SWITCH

Switches grid and plate coils, and associated capacitors of antenna input circuit, R.F. Amplifier V1, Mixer V2, and VFO circuit.

### PRESELECTOR

Controls C104A and C104B in the grid and plate circuits of V1 and V2.

### AGC

*SLOW* – Switches C704 into the AGC circuit, which slows the action of the amplifier.

*FAST* – Switches C704 out of the AGC circuit.

*OFF* – Grounds the AGC Amplifier.

### I.F. NOISE BLANKER NB-600 (600-R Custom Only)

*OFF* – Switches the I.F. NOISE BLANKER out of the circuit. Signal passes straight through to the Crystal Filters.

*MED.* -- Provides MEDIUM clipping of impulse type noise. Normally used on the lower bands where strong signals may tend to overload in the "MAX" position.



**MAX.** — Provides MAXIMUM clipping of impulse type noise. Most effective on the higher bands, particularly on 10 meters.

#### **I.C.A.F. ADJUSTABLE AUDIO NOTCHER-PEAKER (600-R Custom Only)**

**A.F. TUNE** — Adjust frequency of Notch or Peak.

**NOTCH** — An unwanted tone can be nulled out by rotating the A.F. TUNE control.

**OFF** — The Integrated Circuit NOTCHER-PEAKER is switched out of the circuit in this position.

**PEAK** — A desired CW tone is adjusted for maximum strength by rotating the A.F. TUNE control.

**SELECTIVITY** — Used in conjunction with the PEAK position of the control switch. Reduces bandwidth when turned clockwise, and increases bandwidth when turned counter clockwise. Normally this control will be set to about 12 o'clock.

#### **PRE-OPERATING ADJUSTMENTS:**

Perform the following adjustments before plugging the line cord into an AC receptacle.

1. Turn POWER switch to OFF by rotating the A.F. GAIN control full counter clockwise.
2. Set Function Switch to "ON" position. Set to EXT MUTE position if the 600-R is interconnected with a Swan Model 600-T Transmitter or Swan Transceiver.
3. Connect a 50 to 75 ohm antenna to the "J1 ANTENNA" jack on the rear panel of the receiver. Refer to Figures 2, 3, or 4, whichever applies.
4. Be sure that all plugs are fully inserted into their respective connectors. As received from the factory, the 600-R is prepared to operate on its own, having a jumper plug in the "EXT OSC" socket.
5. Plug the 117 VAC power cord into a 117 volt 50-60 cycle receptacle. If the receptacle to be used does not have provisions for the third pin, which is a grounding pin, an adaptor will be required, or the pin may be cut off. Adaptors are available from electronic or hardware stores. A separate ground wire run to the 600-R chassis is then recommended.

#### **RECEIVER OPERATION:**

Rotate the A.F. GAIN control clockwise to about the 3 o'clock position. The power switch will operate applying filament, bias, medium, and high voltage to the receiver.

Wait approximately one minute to allow the tube filaments to reach operating temperature. During this period, perform the following steps:

1. Rotate the BAND SWITCH to the desired band.
2. Rotate the PRESELECTOR control to the approximate frequency. The Upper Scale is for 40, 20, 15, and 10 meters, and the Lower Scale is for 80 meters.
3. Rotate the R.F. GAIN control fully clockwise.
4. Set the SIDEBAND SELECTOR switch to NORMAL sideband position.
5. Set the SELECTIVITY switch to the "2.7" position.
6. Set the VFO CONTROL switch to the SPLIT position.
7. Set the Function Switch to the ON position. If the 600-R is interconnected with the 600-T, or Swan Transceiver, set the Function Switch to the EXT MUTE position.
8. Select the desired AGC operating condition, SLOW-FAST-OFF. The SLOW position is normally used.
9. Rotate the MAIN TUNING control to the desired frequency.
10. Set the NOTCHER-PEAKER control to the OFF position: (Swan 600-R Custom only).
11. Set the I.F. Noise Blanker to OFF position: (Swan 600-R Custom only).
12. Rotate the DIAL SET control to 0, or 28.5 position if operation is on 10 meters.

#### **RECEIVER TUNING:**

The Main Tuning Dial has a white scale reading from 0 to 200 kc, which is used for 80, 40, 20, and 15 meter tuning. Below this scale is a separate green scale reading from 0 to 500 kc, which is used only for 10 meter tuning.

The DIAL SET control has a white scale reading from -400 to +400 kc, which is used for 80, 40, 20, and 15 meter tuning. Below this scale is a green scale reading from 28.0 to 29.2 mc., which is used only for 10 meter tuning.

#### **SSB RECEPTION:**

To receive SSB transmissions:

1. Set SIDEBAND SELECTOR switch to NORMAL sideband position. This provides for reception of Lower Sideband on 318 and 7.1 mc. bands, and Upper Sideband on 14, 21, and 28 mc. bands. If a station is transmitting opposite to this normal arrangement, then switch to "OPP".

2. Set SELECTIVITY switch to "2.7" position.
3. Peak PRESELECTOR control for maximum signal. Each of the bands is calibrated on the PRESELECTOR scale as a guide.
4. On Swan 600-R Custom models, set the I.F. Noise Blanker to "MED" on the lower bands, and "MAX" on the higher bands, to effectively suppress impulse type noise.
5. On Swan 600-R Custom models, to suppress a heterodyne tone that is close to your operating frequency, set the NOTCHER-PEAKER to the NOTCH position, and rotate the A.F. TUNE control until the heterodyne tone is nulled out.

Precise tuning of a single sideband signal is very important. Do not be satisfied to merely tune until the voice can be understood, but take the extra care of setting the dial to the exact spot where the voice sounds natural. Above all, avoid the habit of tuning so that the voice is pitched higher than normal.

### AM RECEPTION:

To receive AM transmissions:

1. Set SIDEBAND SELECTOR switch to AM position.
2. Set SELECTIVITY switch to "2.7" position, or 6.0 position if a 6.0 kc AM filter is installed.

### CW RECEPTION:

To receive CW transmissions:

1. Set SIDEBAND SELECTOR switch to NORMAL sideband position.
2. Set SELECTIVITY switch to "2.7" position, or 0.6 kc position if the narrow band 600 cycle CW filter is installed.
3. On Swan 600-R Custom models, set the NOTCHER-PEAKER control to the PEAK position. Rotate the A.F. TUNE control for maximum signal. Adjust the SELECTIVITY control for desired bandwidth. Normally this control is set at 12 o'clock.

### FREQUENCY SHIFT KEYING (FSK) — SLOW SCAN TELEVISION (SSTV)

There are no modifications required to operate the Swan Model 600-R/600-R Custom receivers with FSK or SSTV. The headphone jack on the 600-S/600-SP speakers can be utilized for FSK/SSTV input. Additionally, if desired, the

speaker jack located on the rear panel of the receivers can also be used for FSK/SSTV input.

### FREQUENCY CALIBRATION:

To calibrate the Main Tuning Dial:

1. Rotate MAIN TUNING control clockwise until the 0 on the large dial is aligned with the red indicator line.
2. Unlock the DIAL SET control by turning the locking ring counter clockwise.
3. Rotate the DIAL SET control until the 0 on the white scale, or 28.5 on the green scale, is approximately aligned with the red indicator line.
4. Set the 600-R VFO CONTROL switch to the SPLIT or XCV-R position.
5. Set the PRESELECTOR control to the proper band area.
6. Set the FUNCTION SWITCH on the 600-R to the Calibrate, 100 kc position.
7. Zero-beat the 100 kc calibration marker using the DIAL SET control.
8. The 600-R Main Tuning Dial is now calibrated for normal sideband, phone band coverage. The 0 to 200 dial scale will now tune from 3.8 to 4.0 mc., 7.1 to 7.3 mc., 14.2 to 14.4 mc., and 21.3 to 21.5 mc. respectively.

The dial reading is added to the bandswitch setting. For example: In the 3.8 position, a dial reading of 100 indicates a frequency of 3.9 mc., or 3,900 kc.

In the 10M position, the reading obtained from the green 0 to 500 scale is added to the frequency that the DIAL SET indicator line is aligned with. For example: when the DIAL SET is aligned on 28.5, the MAIN TUNING will tune 28.5 to 29.0 mc. Thus, if the dial reads 200, the indicated frequency is 28.7 mc., or 28,700 kc.

### TUNING HIGHER OR LOWER FREQUENCY SEGMENTS:

Higher or lower frequency coverage is obtained by moving the DIAL SET control in 100 kc. increments. You will note that the DIAL SET scale is calibrated from -400 to +400. By using the 100 kc. calibrator built into the 600-R, the tuning range may be moved up or down very easily. (See Frequency Coverage Chart.)

For Example: If it is desired to operate from 14.0 to 14.2:

1. Set Main Tuning Dial to 0.

2. Unlock DIAL SET control.
3. Rotate DIAL SET control until the 100 kc calibrator marker is zero-beat in the -200 increment.
4. The receiver is now tuned to 14.0 mc., and by rotating the MAIN TUNING control, reception is possible up to 14.2 mc.
5. Use the same procedure to cover various segments of other bands, either below or above the normal segments. (See Frequency Coverage Chart.)

### **WWV RECEPTION WITH 600-R/600-T/SWAN TRANSCEIVER COMBINATIONS:**

Time signals from the Bureau of Standards WWV and WWVH may be received at 10, 15, 20, and 25 mc. with the 600-R and 600-T combination. If the 600-R is mated with a Swan Transceiver, 10, 15, and 20 mc. may be received. Both units, or the 600-R and Swan Transceiver, are required since it is necessary to tune the 600-R PRESELECTOR control to the WWV signal frequency, and use the 600-T or Swan Transceiver VFO for heterodyne injection. The VFO selector switch on the 600-R must be set to "XCV-T" position.

WWV Freq.	600-T Main Tuning Dial	Swan Transceiver Tuning Dial	600-R Bandswitch	600-R Preselector
10 mc.	21.0 mc.	21.0 mc.	7.1 or 14.2	10 mc.
15 mc.	4.0 mc.	4.0 mc.	14.2	15 mc.
20 mc.	*7.25 mc.	*7.25 mc.	21.3	20 mc.
25 mc.	*4.25 mc.	Not within Range	10M	25 mc.
*2nd harmonic of VFO frequency is used for heterodyning to the signal frequency. For example: $7,250 + 5,500 \text{ kc} = 12,750$ , the 600-T VFO frequency. $2 \times 12,750 = 25,500 \text{ kc}$ and $25,500 - 5,500 = 20,000 \text{ kc}$ , WWV.				

Reception of WWV signals in this manner points up the versatility of the 600-R/600-T/Swan Transceivers combination. Because the 600-R PRESELECTOR tunes continuously from 3 to 30 mc., a fairly wide number of ranges are available outside the amateur bands by using the 600-T/Swan Transceiver VFO. The PRESELECTOR circuits of the 600-R may be tuned 5500 kc above or below the 600-T/Swan Transceiver VFO frequency to receive signals. In addition,

the PRESELECTOR may be tuned 5500 kc above or below the second harmonic of the 600-T/Swan Transceiver VFO. A certain amount of calculating is required, and naturally the Swan Model 330 General Coverage Tuner is more satisfactory for those who wish a fully calibrated dial scale with full coverage from 3 to 30 mc. Refer to your Swan Catalog or Swan distributor for complete data on the 330 tuner.



## 600-R/600-T FREQUENCY COVERAGE CHART

### LOWER FREQUENCY SEGMENTS

Bandswitch Position	Tuning Range with Dial Set At 0	Tuning Range with Dial Set At -100	Tuning Range with Dial Set At -200	Tuning Range with Dial Set At -300	Tuning Range with Dial Set At -400
3.8	3.8 - 4.0	3.7 - 3.9	3.6 - 3.8	3.5 - 3.7	3.4 - 3.6
7.1	7.1 - 7.3	7.0 - 7.2	6.9 - 7.1	6.8 - 7.0	6.7 - 6.9
14.2	14.2 - 14.4	14.1 - 14.3	14.0 - 14.2	13.9 - 14.1	13.8 - 14.0
21.3	21.3 - 21.5	21.2 - 21.4	21.1 - 21.3	21.0 - 21.2	20.9 - 21.1

### HIGHER FREQUENCY SEGMENTS

Bandswitch Position	Tuning Range with Dial Set At 0	Tuning Range with Dial Set At +100	Tuning Range with Dial Set At +200	Tuning Range with Dial Set At +300	Tuning Range with Dial Set At +400
3.8	3.8 - 4.0	3.9 - 4.1	4.0 - 4.2	4.1 - 4.3	4.2 - 4.4
7.1	7.1 - 7.3	7.2 - 7.4	7.3 - 7.5	7.4 - 7.6	7.5 - 7.7
14.2	14.2 - 14.4	14.3 - 14.5	14.4 - 14.6	14.5 - 14.7	14.6 - 14.8
21.3	21.3 - 21.5	21.4 - 21.6	21.5 - 21.7	21.6 - 21.8	21.7 - 21.9

### 10 METER FREQUENCY SEGMENTS

Bandswitch Position	Tuning Range with Dial Set At 28.5	Tuning Range with Dial Set At 28.0	Tuning Range with Dial Set At 29.0	Tuning Range with Dial Set At 29.2
10M	28.5 - 29.0	28.0 - 28.5	29.0 - 29.5	29.2 - 29.7

- Use 100 kc calibrator position for exact setting of 100 kc increments.
- Lock the DIAL SET control to hold in position. This need not be a hard lock, but just enough drag to make turning tight.
- Calibration accuracy of the MAIN TUNING dial is closest in the normal phone band ranges. In lower portions of each band, that is, in the CW bands, check frequency carefully with 100 kc and 25 kc calibration markers.

# ALIGNMENT AND TROUBLESHOOTING

The following procedures are given in the order performed during the factory alignment for the receiver. For home servicing, only partial alignment may be necessary. Read all procedures carefully before commencing either partial or complete alignment. See Figures 7, 8, and 9 for component placement. The following equipment is recommended for complete alignment.

1. R.F. Signal Generator (3 to 30 mc).
2. Vacuum Tube Voltmeter (VTVM).

## RECEIVER ALIGNMENT:

Receiver alignment involves the adjustment of the antenna coils L101 through L105; the Mixer coils L201 through L205; and the I.F. coupling transformers T201, T301, and T401.

1. After allowing approximately ten minutes for warm-up, rotate the Main Tuning Dial until the 0 is aligned with the red indicator line.
2. Rotate the DIAL SET control until the 0 on the white scale, and 28.5 on the green scale, are aligned with the red indicator line.
3. Set the SIDEBAND SELECTOR switch to the NORMAL position.
4. Set BAND switch to band being aligned.
5. Set AGC switch to FAST position.
6. Set VFO CONTROL switch to XCV-R position.
7. Set SELECTIVITY switch to 2.7 position.
8. Set R.F. GAIN control to full clockwise position.
9. Set A.F. GAIN control to normal operating audio level.
10. Set PRESELECTOR control to the approximate frequency for the band being aligned.
11. Set FUNCTION SWITCH to ON position.
12. With a 50 ohm dummy load connected to the antenna input jack, or the receiving antenna connected to the jack, adjust T401, T301 and T201 for maximum noise (see Figure 7).

13. Switch the SIDEBAND SELECTOR switch to AM position.
14. Re-adjust T301 for maximum noise. Switch back to NORMAL position.
15. Disconnect the dummy load or antenna, and connect the R.F. Signal Generator output to the antenna input jack.
16. Set the R.F. Signal Generator output level to 10 microvolts.
17. Using the chart below, adjust the antenna and Mixer coils for maximum signal. When properly adjusted, the receiver S-Meter should read approximately S7 to S9 with 10 microvolts input. When the input level is reduced to approximately 1/10 microvolt, the signal should still be audible (see Figure 7).

R.F. Signal Generator Frequency	Antenna Coils	Mixer Coils
3800	L101	L201
7100	L102	L202
14200	L103	L203
21300	L104	L204
28500	L105	L205

## ALTERNATE METHOD OF RECEIVER ALIGNMENT:

If an R.F. Signal Generator is not available, an alternate method of aligning the receiver is to use the built-in 100 kc crystal calibrator. Prior to commencing the alignment, check the calibrator against WWV. To align the receiver using the calibrator, set the FUNCTION SWITCH to CAL 100 kc, and proceed with the alignment as described above.

## CRYSTAL CALIBRATOR FREQUENCY ADJUSTMENT:

The WWV signal, which is used to adjust the built-in 100 kc calibrator, can be received using the 600-R interconnected with the 600-T or Swan Transceiver; the Model 508 External VFO connected to the 600-R; or the Model 330 General Coverage Tuned. Otherwise, an outside source, such as

an external receiver that will tune to WWV. To adjust the calibrator using the 600-R/600-T/Swan Transceiver combination, tune in WWV using the procedures described under "WWV RECEPTION WITH 600-R/600-T/Swan Transceiver Combinations" in the OPERATION section. These same tuning procedures apply when using the Model 508 with the 600-R. When the Model 330 General Coverage Tuner is used, tune in WWV direct. After WWV has been tuned in, turn on the 100 kc calibrator, and if the calibrator can be heard in the speaker, adjust C1302 (see Figure 7) to zero-beat with WWV. If an external receiver is used, locate the R.F. Amplifier tube socket, V1. Wrap one end of an insulated wire lead loosely around pin 1. Connect the other end to the antenna terminal of the external receiver. Tune external receiver to zero-beat WWV. Turn on 100 kc calibrator, and by listening to it on the external receiver, adjust C1302 to zero-beat with WWV.

### **25 KC MULTIVIBRATOR ADJUSTMENT:**

The calibrator circuit board has a trimmer type potentiometer which is used to adjust the multivibrator circuit so it divides the 100 KC calibrator output by a factor of 4, thus providing calibration markers every 25 kc. If markers are received every 20 kc or every 33-1/3 kc, adjustment is required. A small adjusting hole will be found on top of the R.F. tuner, directly back of V1, the R.F. Amplifier tube. Use a small insulated screwdriver, and carefully turn the trimmer control, R1308, until calibration markers are received every 25 kc (see Figure 7).

### **S-METER ADJUSTMENT.**

Disconnect antenna, detune "PRESELECTOR" control for minimum noise, and turn R.F. GAIN to maximum clockwise position. Set R405, located on the rear panel, for zero meter reading. Make sure that no local signals are being received (see Figure 6).

### **BFO OSCILLATOR (CARRIER FREQUENCY) ADJUSTMENT:**

#### **NOTE**

If the 600-R is mated to a 600-T, or to a Swan Transceiver, refer to "CARRIER SYNCHRONIZATION" paragraph in the INSTALLATION SECTION, and follow that procedure. If the 600-R is not mated to a Swan Transmitter, then use the following procedure.

To adjust the BFO oscillator:

1. Set **SIDEBAND SELECTOR** switch to **NORMAL** position.

2. Set **BAND** switch to 3.8 position.
3. Rotate **Main Tuning Dial** off of any 100 kc or 25 kc markers.
4. Detune **PRESELECTOR** control.
5. Turn on 100 kc calibrator.
6. If the 5500 kc **BFO** oscillator crystal is off frequency, an audible signal will be heard in the speaker of the receiver. Adjust C907 until the BFO is zero-beat with the calibrator (see Figure 8).
7. Since the **OPPOSITE BFO** crystal is 5503.3 kc, it cannot be adjusted with the 100 kc calibrator. To adjust the **OPPOSITE BFO** crystal frequency, it is necessary to use either a frequency counter; a 5503.3 kc crystal controlled frequency input; or have a receiver that has been accurately calibrated and can be tuned to exactly 5503.3 kc. Whichever method is used, adjust the receiver 5503.3 kc **OPPOSITE BFO** crystal frequency using C908 (see figure 8).

### **VFO ALIGNMENT:**

A trimmer is provided for each VFO range. Trimmer adjustment for the five VFO ranges is through the top cover of the VFO compartment. An insulated adjusting tool is recommended. Dial tracking has been factory set by pruning the coils, and will not ordinarily require further adjustment.

When dial calibration changes beyond the adjusting range indicated on the **DIAL SET** dial, calibration may be restored by carefully adjusting the trimmer for that range (see Figure 7).

### **L106, 11.9 mc. TRAP ADJUSTMENT:**

1. Set **SIDEBAND SELECTOR** in **NORM** position.
2. Set **BAND SWITCH** to 14.2.
3. Set **MAIN TUNING** dial to 0.
4. Set **DIAL SET** control to 0.
5. Peak **PRESELECTOR** in the 14 mc. range.
6. Feed an unmodulated 11.9 mc. R.F. signal into the antenna jack.
7. Set **Signal Generator** output level at 100 mv or better.
8. Tune the generator for audible beat note in the receiver.
9. Adjust L106 for minimum S-Meter reading (see Figure 7).

### VFO FREQUENCY CHART

Calibrated Dial Frequency	Actual VFO Frequency
3500 KC	9000 KC
3800	9300
4000	9500
7000	12500
7200	12700
7300	12800
14000	8500
14200	8700
14350	8850
21000	15500
21250	15750
21450	15950
28000	22500
28500	23000
29000	23500
29700	24200
30000	24500

### VOLTAGE-RESISTANCE CHART

TUBE		PIN NO.								
		1	2	3	4	5	6	7	8	9
V1- 6BZ6	V	-.7	G	G	6.3 AC	210	60	G		
	R	250K	G	G	0	40K	200K	G		
V2- 6BZ6	V	-.7	1.1	6.3 AC	12.6 AC	160	20	G		
	R	550K	4.7K	0	0	300K	5 Meg	G		
V3-12BA6	V	-.9	G	G	12.6 AC	210	60	G		
	R	750K	G	G	0	40K	50K	G		
V4-12BA6	V	-.9	G	G	12.6 AC	210	60	.63		
	R	850K	G	G	0	40K	50K	100		
V5-12AX7	V	82	-1.7	.16	12.6 AC	G	130	-1.1	G	N.C.
	R	300K	75K	300	0	G	200K	1 Meg	G	N.C.
V6-12AQ5	V	-11	G	G	12.6 AC	235	220	N.C.		
	R	950	G	G	0	4K	5K	N.C.		
V7-12AV6	V	0	9.4	G	12.6 AC	N.C.	0	220		
	R	470K	5K	G	0	N.C.	1.5M	15K		
V8-12BA6*	V	0	G	G	12.6 AC	210	75	5		
	R	2-2	G	G	0	30K	40K	100		
V9-12BA6*	V	0	G	G	12.6 AC	210	75	5		
	R	100K	G	G	0	30K	40K	100		
All measurements were taken using a H/P Model 410B VTVM. All voltages are DC unless otherwise specified.										
*V8 and V9 are NB-600 noise blanker amplifiers, and are used in the 600-R Custom only.										



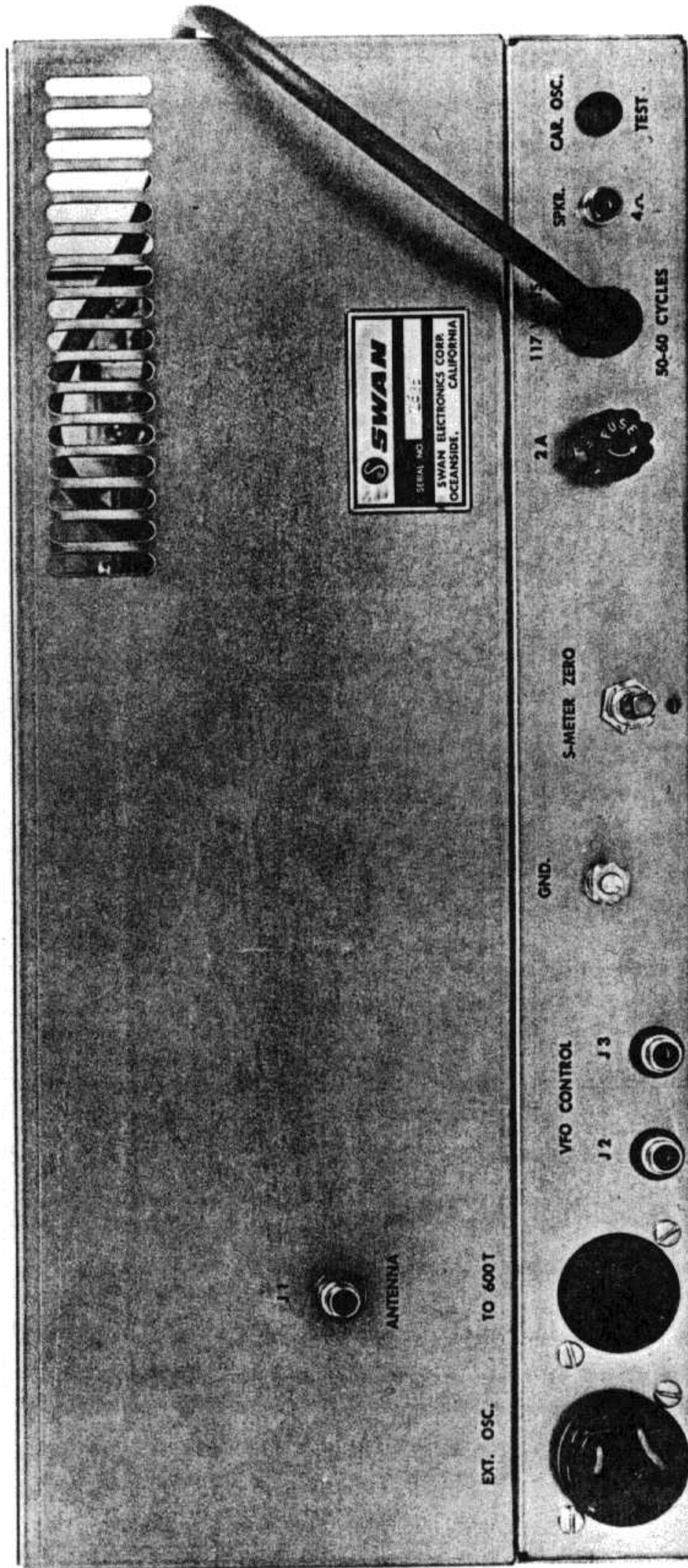
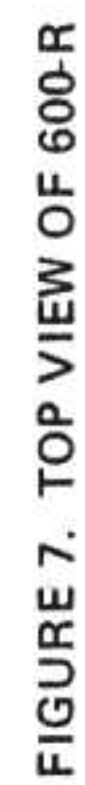


FIGURE 6. REAR VIEW OF 600-R







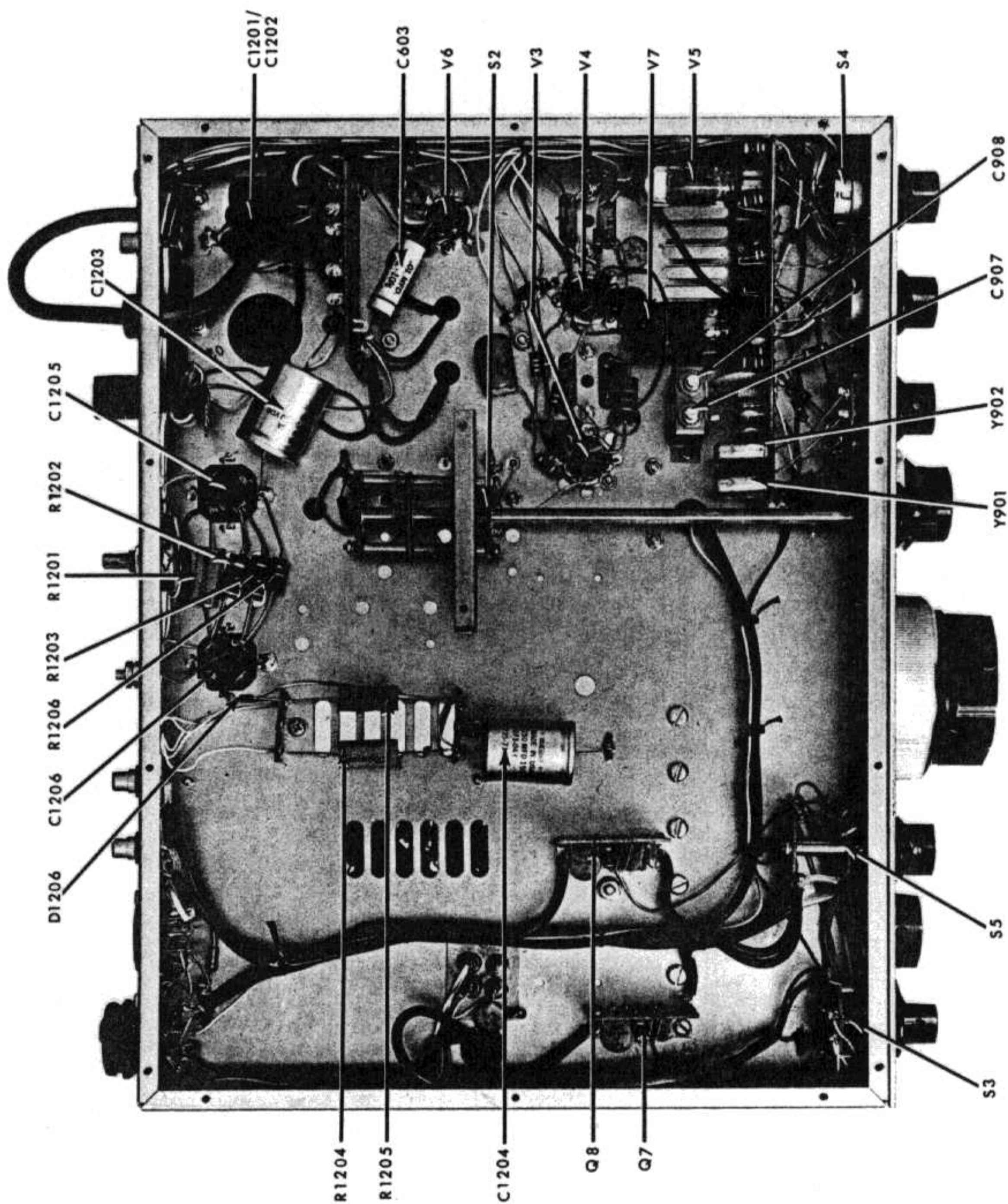


FIGURE 8. BOTTOM VIEW OF 600-R



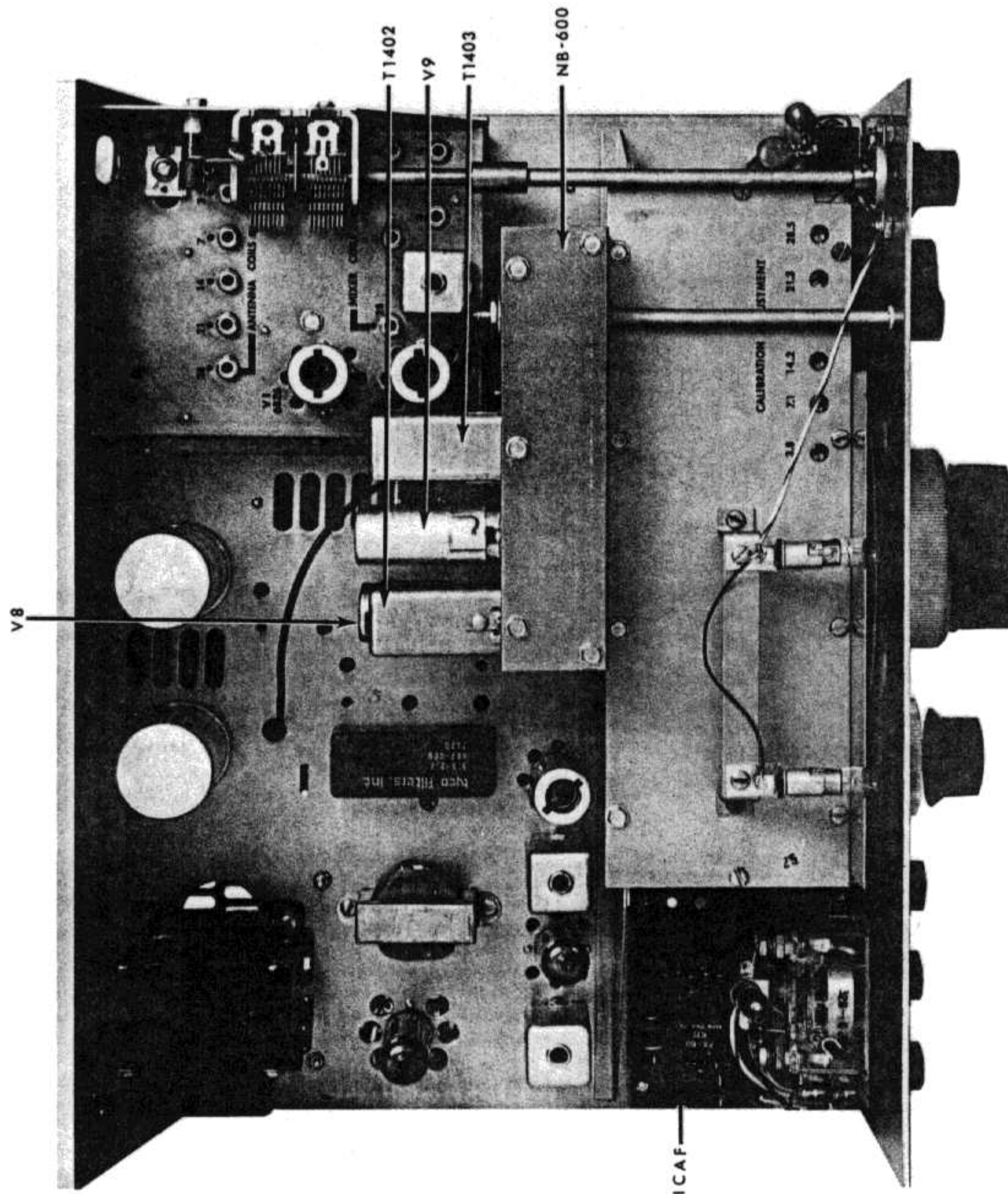
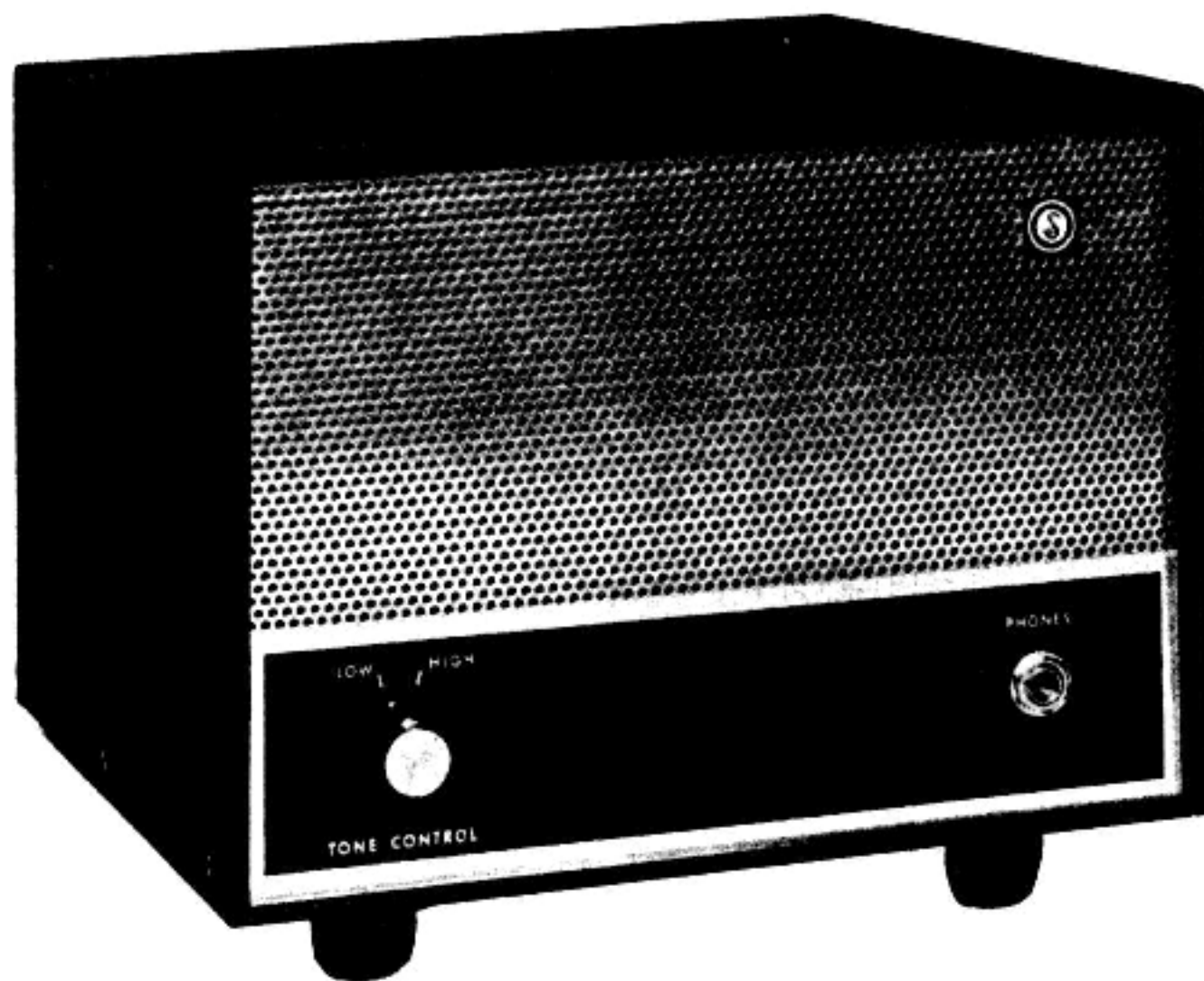


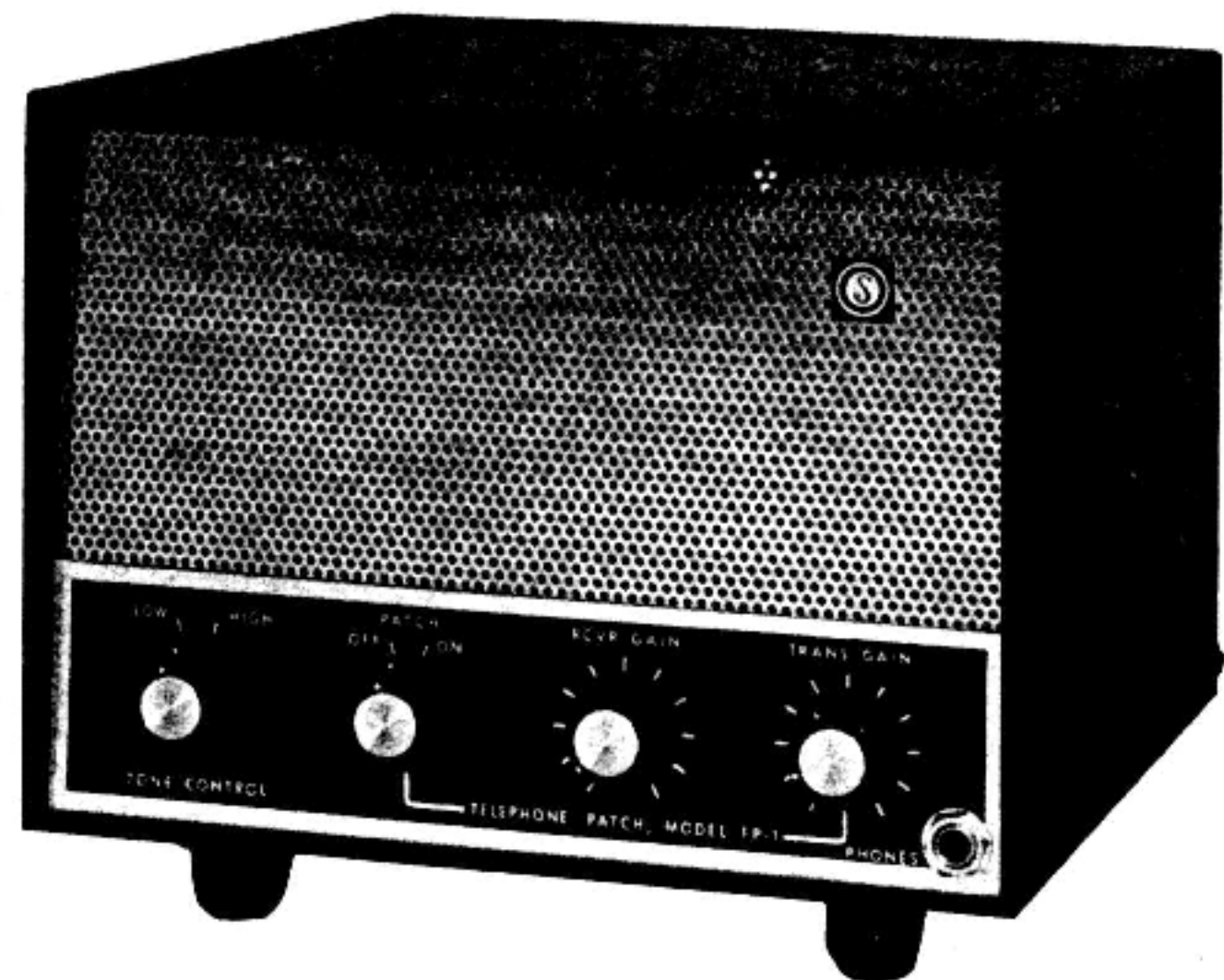
FIGURE 9. TOP VIEW OF 600-R CUSTOM RECEIVER





**600-S**

The Model 600-S Standard Speaker is a 4 ohm 4 watt speaker with tone switch and headphone jack.



**600-SP**

The Model 600-SP Deluxe Speaker is a 4 ohm 4 watt speaker with tone switch, headphone jack, and built-in FP-1 Phone Patch.

**THE MODEL FP-1 PHONE PATCH** is designed to connect a radio receiver and transmitter, or transceiver, to a telephone so that the party on the other end of the telephone line can listen and talk over the radio circuit. The unit is designed specifically to connect easily and quickly to the SWAN MODEL 600-R/600-T and Swan Transceivers.

#### **FP-1 PHONE PATCH SPECIFICATIONS:**

1. "Line" Input Impedance . . . . . 600 ohms
2. Speaker Impedance . . . . . 3-4 ohms
3. Receiver Output Impedance . . . . . 3-4 ohms
4. Microphone (Low Level Output). . . High Impedance
5. Phone Patch Output to Transmitter. . High Impedance
6. Mic. Jack: 3 circuit, Phone Jack Type, 1/4 inch diam.
7. Mic Plug: 3 circuit, Phone Jack Type, 1/4 inch diam., matches all Swan Transmitters/Transceivers. Includes Press-to-talk circuit.

8. Panel Controls: (a) ON-OFF Switch, (b) Receiver Gain, controls volume level of signal going from the radio into the telephone. (c) Transmitter Gain, controls volume level of signal going from the telephone into the transmitter.
9. Rear Control: "NULL" adjustment. Important only during VOX operation. Keeps the received radio signal from tripping the VOX. Factory set, should not require adjustment.

The FP-1 is a hybrid telephone design, which means that it may be used with VOX (automatic voice controlled transmit) as well as with manual transmit control. Connections with the Transceiver and telephone have been organized so that once it is installed there is no need to plug or unplug the microphone or cables when using or not using the Phone Patch. The regular station microphone plugs into the back of the Phone Patch, while the shielded cable with plug coming from the phone patch plugs into the Mic. Jack of the Transceiver. When the Phone Patch is turned "OFF", the microphone is connected to the Transceiver for normal operation. When the Phone Patch is turned "ON", the telephone becomes the microphone. However, the press-to-talk switch on the station mike is still operative, and so is still used to switch from receive to transmit, unless VOX is being used.

# 600-R STANDARD AND CUSTOM MODELS

## PARTS LIST

Ref. Symbol	Description	Part Number	Ref. Symbol	Description	Part Number
<b>CAPACITORS</b>			C803	.01 +80 -20% 500V Disc	072-023
C101	30, 5% N150 Disc	084-044	C804	.01 +80 -20% 500V Disc	072-023
C102	30, 5% N150 Disc	084-044	C901	270, 2% 500V Mica	088-014
C103	30, 5% N150 Disc	084-044	C902	270, 2% 500V Mica	088-014
C104A	136, Variable	074-024	C903	.01, +80 -20% 500V Disc	072-023
C104B	136, Variable	074-024	C904	30 mf, 15V Electrolytic	073-047
C105	68, 5% 500V Mica	088-030	C905	10, 5% NPO Disc	084-060
C106	150, 5% 500V Mica	088-006	C906	10, 5% NPO Disc	084-060
C107	.001 20% Disc	072-006	C907	2.4-24.5 pf Variable	075-018
C108	.01 +80 -20% 500V Disc	072-023	C908	2.4-24.5 pf Variable	075-018
C109	.01 +80 -20% 500V Disc	072-023	C909	.22, 200 VDC	085-021
C110	1000, 1 Kv Feedthru	077-002	C1001	.01 +80 -20% 500V Disc	072-023
C111	Not Used		C1002	30 mf, 15V Electrolytic	073-047
C112	10 5% NPO Disc	084-060	C1003	30, 5% NPO Disc	084-011
C113	10, 10% Disc	088-038	C1004	.01, +80 -20% 500V Disc	072-023
C201	30, 5% N150 Disc	084-044	C1101	1.8-13 pf, Variable	075-005
C202	30, 5% N150 Disc	084-044	C1102	1.8-13 pf, Variable	075-005
C203	30, 5% N150 Disc	084-044	C1103	1.8-13 pf, Variable	075-005
C204	.01 +80 -20% 500V Disc	072-023	C1104	1.8-13 pf, Variable	075-005
C205	68, 5% 500V Mica	088-030	C1105	1.8-13 pf, Variable	075-005
C206	150, 5% 500V Mica	088-006	C1106	12, Variable	074-026
C207	100, 5% 500V Mica	088-004	C1107	39, Variable	074-056
C208	.002 20% Disc	072-006	C1108	270, 2% 500V Mica	088-014
C209	.02 +80 -20% 500V Disc	072-023	C1109	470, 5% 500V Mica	088-032
C210	.01 +80 -20% 500V Disc	072-023	C1110	.01, +80 -20% 500V Disc	072-023
C211	1000, 1 Kv Feedthru	077-001	C1111	430, 2% 500V Mica	088-024
C212	1000, 1 Kv Feedthru	077-001	C1112	27, 5% 500V Mica	088-023
C301	.22 Tubular 200V	072-023	C1113	430, 2% 500V Mica	088-024
C302	.01 +80 -20% 500V Disc	072-023	C1114	.01 +80 -20% 500V Disc	072-023
C303	.02 +80 -20% 500V Disc	072-023	C1115	Selected Value	
C304	Not Used	085-021	C1116	Selected Value	
C401	.01 +80 -20% 500V Disc	072-023	C1117	Selected Value	
C402	.01 +80 -20% 500V Disc	072-023	C1118	Selected Value	
C403	.01 +80 -20% 500V Disc	072-023	C1119	Selected Value	
C404	.01 +80 -20% 500V Disc	072-023	C1120	22, 5% N220 Disc	084-030
C405	1, 10% Tubular	071-001	C1201	.0047, 20% 1000V Molded Mica	085-012
C501	220, 20% 500V Disc	072-017	C1202	.0047, 20% 1000V Molded Mica	085-012
C502	.002, 20% 500V Disc	072-018	C1203	150 mf, 150V Electrolytic	073-043
C503	150, 5% 500V Disc	088-006	C1204	150 mf, 150V Electrolytic	073-043
C504	.05, +80 -20% 100V Disc	072-036	C1205A	80 mf, 400V Electrolytic	073-044
C505	500, 20% 500V Disc	072-022	C1205B	80 mf, 400V Electrolytic	073-044
C506	.002, 20% 500V Disc	072-018	C1206A	80 mf, 400V Electrolytic	073-044
C507	.001, 20% 500V Disc	072-006	C1206B	80 mf, 400V Electrolytic	073-044
C601	.01, 1000V Tubular	085-027	C1301	390, 5% 500V Mica	088-050
C701	.01, +80 -20% 500V Disc	072-023	C1302	5-80, Mica Compression	089-002
C702	.047, 20% 200V Mica	085-026	C1303	.002, 10% Disc	072-035
C703	.047 200V Molded	085-014	C1304	.01 10% Disc	072-034
C704	.22 200V Molded	085-029	C1305	5, 5% NPO Disc	084-022
C705	Not Used	085-014	C1306	1000, 1 Kv Feedthru	077-001
C801	30, 5% NPO Disc	084-011	C1307	.01 +80 -20% 500V Disc	072-023
C802	30 mf, 10V Electrolytic	073-047	C1308	.01 +80 -20% 500V Disc	072-023

Capacitors are in Picofarads when listed as a whole number unless otherwise specified. When listed as a decimal number, value is in microfarads unless otherwise specified. Resistors are 10% tolerance, 1/2 watt rating, unless otherwise specified.



Ref. Symbol	Description	Part Number
<b>RESISTORS</b>		
R101	1 Meg	042-105
R102	2.2 Meg	042-225
R103	27 Ohms	042-270
R104	150K	042-154
R105	27 Ohms	042-270
R106	470 Ohms	042-471
R107	25K Pot.	052-044
R108	10K	042-103
R201	4.7K	042-472
R202	4.7K	042-472
R203	10K	042-103
R204	22K	042-223
R205	1K	042-102
R206	4.7K	042-472
R207	270K	042-274
R208	10K	042-103
R209	470 Ohms	042-471
R210	270K	042-224
R301	470 Ohms	042-471
R302	10K	042-684
R303	33K 2W	044-333
R304	1K	042-102
R401	100K	042-105
R402	10K	042-104
R403	100 Ohms	042-103
R404	82K, may be selected	042-101
R405	1K Pot.	042-823
R406	1K	052-014
R407	330 Ohms	042-102
R408	27K 1W	042-331
R501	100K	042-104
R502	270 Ohms	042-271
R503	270K	042-274
R504	47K	042-473
R505	1 Meg	042-105
R506	10K	042-103
R507	470K	042-474
R508	47K	042-473
R509	100K	042-104
R510	10 Meg	042-106
R601	1 Meg Pot.	052-010
R701	6.8K	042-473
R702	470K	042-474
R703	4.7K	042-472
R704	270 Ohms	042-274
R705	Not Used	042-105
R706	100K	042-224
R801	100 Ohms	042-101
R802	2.7K	042-272
R803	150 Ohms	042-151
R804	2.7K	042-272
R805	470 Ohms	042-471
R806	100 Ohms	042-101
R807	10K	042-103
R901	18K	042-183

Ref. Symbol	Description	Part Number
R902	1.5K	042-152
R903	2.2K	042-222
R904	100 Ohms	042-101
R905	330 Ohms	042-331
R906	1K	042-102
R907	4.7K	042-472
R1001	100 Ohms	042-1001
R1002	470 Ohms	042-471
R1003	2.7K	042-272
R1004	2.7K	042-272
R1005	150 Ohms	042-151
R1101	1K 5%	046-102
R1102	1K 5%	046-102
R1103	1K 5%	046-102
R1104	470 Ohms 5%	046-471
R1105	2.7K	042-272
R1106	2.7K	042-272
R1107	470 Ohms 5%	046-471
R1108	10K	042-103
R1201	200 Ohms 5W	049-038
R1202	470 Ohms 2W	044-471
R1203	470 Ohms 2W	044-471
R1204	47 Ohms 2W	044-470
R1205	350 Ohms 10W	049-024
R1206	100K 1W	043-104
R1301	100K	042-104
R1302	10K	042-103
R1303	100K	042-104
R1304	10K	042-103
R1305	27K	042-273
R1306	47K	042-473
R1307	33K	042-333
R1308	5K Pot.	052-043
R1309	2.2K	042-222
R1310	3.9K	042-392
R1311	4.7K	042-472
R1312	3.9K	042-392
<b>TRANSFORMERS</b>		
T201	Mixer Coupling	014-017
T301	First I.F. Amp. Coupling	014-012
T401	Second I.F. Amp. Coupling	014-012
T601	Audio Output	272-001
T1201	Power	271-020
<b>SWITCHES</b>		
S1A-E	Bandswitch	171-110
S2	Selectivity	171-107
Se	Function	171-106
S4	Power	052-010
S5	VFO Control	171-104
S6	Sideband Selector	171-116
S7	AGC	172-013

Ref. Symbol	Description	Part Number
<b>CRYSTALS</b>		
Y901	5500 KC BFO Osc.	486-038
Y902	5503.3 KC BFO Osc.	486-039
Y1301	100 KC Calibrator	486-006
<b>COILS</b>		
L101	80 Mtr Ant Coil	012-107
L102	40 Mtr Ant Coil	012-108
L103	20 Mtr Ant Coil	012-109
L104	15 Mtr Ant Coil	012-109
L105	10 Mtr Ant Coil	012-114
L106	11.9 MC Trap Coil	012-044
L201	80 Mtr Mixer Coil	012-044
L202	40 Mtr Mixer Coil	012-025
L203	20 Mtr Mixer Coil	012-024
L204	15 Mtr Mixer Coil	012-024
L205	10 Mtr Mixer Coil	012-024
L901	200 uh RFC	027-002
L1101	80 Mtr VFO Amp Coil	021-031
L1102	40 Mtr VFO Amp Coil	021-030
L1103	20 Mtr VFO Amp Coil	021-031
L1104	15 Mtr VFO Amp Coil	021-030
L1105	10 Mtr VFO Amp Coil	021-030
L1106	200 uh RFC	027-002
L1107	200 uh RFC	027-002
<b>LAMPS</b>		
B1	GE 1815	471-005
B2	GE 1815	471-005
B3	GE 1815	471-005
<b>METER</b>		
M1	0-60 DB	112-023

Ref. Symbol	Description	Part Number
<b>DIODES</b>		
D101	1N914	475-021
D701	1N914	475-021
D702	1N914	475-021
D703	1N914	475-021
D1201	1N4002	475-023
D1202	1N4002	475-023
D1203	1N4002	475-023
D1204	1N4002	475-023
D1205	1N4002	475-023
D1206	Semcor LMZ 12.0 2W 10% Zener	475-020
<b>TRANSISTORS</b>		
Q1	MPS3693	476-008
Q2	MPS3693	476-008
Q3	MPS3693	476-008
Q4	MPS3693	476-008
Q5	2N706	476-001
Q6	2N706	476-001
Q7	2N706	476-001
Q8	2N706	476-001
Q9	2N706	476-001
<b>TUBES</b>		
V1	6BZ6 R.F. Amplifier	472-046
V2	6BZ6 Mixer	472-046
V3	12BA6 First I.F. Amplifier	472-024
V4	12BA6 Second I.F. Amplifier	472-024
V5	12AX7 Produce Detector/First Audio Amplifier	472-009
V6	12AQ5 A.F. Output	472-052
V7	12AV6 AGC Amp.	472-019

All Resistors are 1/2 watt 10% tolerance unless otherwise specified.

# 600-R CUSTOM ADDITIONAL PARTS LIST

## NB-600 NOISE BLANKER

Ref. Symbol	Description	Part Number
<b>CAPACITORS</b>		
C1401	.01, +80 -20% 500V Disc	072-023
C1402	.01, +80 -20% 500V Disc	072-023
C1403	.01, +80 -20% 500V Disc	072-023
C1404	.01, +80 -20% 500V Disc	072-023
C1405	.01, +80 -20% 500V Disc	072-023
C1406	.01, +80 -20% 500V Disc	072-023
C1407	.001, 20% 500V Disc	072-006
C1408	.001, 20% 500V Disc	072-006
C1409	.01, +80 -20% 500V Disc	072-023
C1410	.01, +80 -20% 500V Disc	072-023
<b>RESISTOR</b>		
R1401	47K 1W	043-473
R1402	47K 1W	043-473
R1403	100 Ohms	042-101
R1404	1K	042-102
R1405	100K	042-104
R1406	470K	042-474
R1407	100 Ohms	042-101
R1408	47 Ohms	042-470
R1409	470 Ohms	042-471
R1410	1K	042-102
R1411	1K	042-102
R1412	47 Ohms	042-470
R1413	470 Ohms	042-471
R1414	1K	042-102
R1415	470 Ohms	042-471
<b>TRANSFORMERS</b>		
T1401	I.F. Transformer	014-017
T1402	I.F. Transformer	014-012
T1403	I.F. Transformer	014-017
<b>SWITCHES</b>		
S8	Function Switch	171-118
<b>DIODES</b>		
D1401	1N914	475-021
D1402	1N914	475-021
<b>TUBES</b>		
V8	12BA6	472-024
V9	12BA6	472-024

## I.C.A.F. NOTCHER-PEAKER

Ref. Symbol	Description	Part Number
<b>CAPACITORS</b>		
C1501	5 mf, 16V Electrolytic	073-049
C1502	.005, 100V Disc	078-002
C1503	.02, 100V Disc	078-001
<b>RESISTORS</b>		
R1501	39K	042-393
R1502	10K	042-103
R1503	1 Meg	042-105
R1504	100K	042-104
R1505	33K	042-333
R1506	470 Ohms	042-471
R1507	68K	042-683
R1508	10K	042-103
R1509	10K	042-103
R1510	1.5 Meg	042-155
R1511	47K 2W	044-473
R1512	10K	042-103
R1513	1K	042-102
R1514	10K Reverse Audio Taper	052-047
R1515	Dual 200K-200K Reverse Audio Taper	052-046
<b>DIODES</b>		
D1501	Semcor 1N4742 12V 1W Zener	475-019
<b>TRANSISTORS/INTEGRATED CIRCUITS</b>		
Q9	FX-60	476-005
Q10	40468A	477-001
<b>SWITCH</b>		
S9		171-120

